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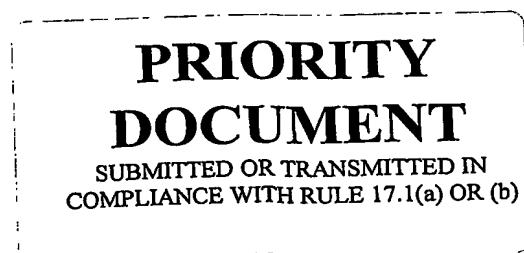
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I, JULIE BILLINGSLEY, TEAM LEADER EXAMINATION SUPPORT AND SALES hereby certify that annexed is a true copy of the Provisional specification in connection with Application No. 2003905043 for a patent by YARRA RIDGE PTY LTD as filed on 16 September 2003.



WITNESS my hand this  
Fourteenth day of July 2004

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## Field of the Invention

This invention relates to locks for displaceable wings, said wings including French Doors, Security Doors and Timber Doors and including hinged and sliding doors.

### 5 Background to the Inventions

French doors, as defined below, typically employ a lock having a lock body that is morticed into the frame on the closing edge wing and handle assemblies that are mounted on each side of the wing adjacent the lock body to be connected to the lock body by a shaft. Now days, these doors are often closed against a strip of 10 compressible sealing material located between the door and an element defining in-part the opening and against which the wing closes (this strip being to prevent energy loss) - this action requiring a not insignificant force.

These doors lend themselves to being urged fully closed by the operation of remote locks having plunger-like members that can be driven into receiving apertures 15 of upper and lower elements of the opening.

Typically locks for common French Doors must have a lock body of small depth that is not more than about 40MM, a small setback not exceeding about 30MM, a small width not exceeding about 16 MM, a bolt that can extend at least 15 MM from the lock body and preferably means to displace rods at least 15 MM. 20 Preferably, an industry standard for the distance between the cylinder and lever axii of 85.00 MM should also be observed.

Typically locks for common Security Doors require the lock to have a smaller lock body having depth not exceeding about 40MM, a setback of about 27MM, a width of about 14.5 MM and not exceeding 16MM, a bolt that can extend at least 14 25 MM from the lock body and preferably means to drive rods at least 11 MM. Preferably, the lock should also comply with the industry standard fitting apertures within the door.

In each case, it is difficult to comply with the space requirements imposed by the conditions described above because bolts needs to extend adequately into the 30 casing when fully extended to be properly supported and this imposes restrictions on integers competing for space adjacent the bolt and because the lock body must fit within a frame extrusion this places restrictions on the bolt, casing and other component depths and widths that also must observe minimum strength requirements. Futher-more, the lock should comply with Australian Standards for 35 Security Doors, Glass Hinged Doors and Locksets that define strength, durability, corrosion resistance, and ease of use performance requirements.

Locks commonly employed in French doors in Australia do not provide compression, they are lockable only by key and it is not possible to lock the exterior lever while the interior is free to operate to enable egress and in many applications this is inconvenient and in some applications it is unsafe. Locks commonly employed

5 in security doors in Australia do have locking by interior locking lever (snib-lever) but do not provide for locking of the exterior lever while retaining the interior lever free to be operated to enable egress.

The inventions herein, include locks that address the inadequacies of locks commonly employed in French doors and security doors.

10 The inventions herein, comprise improved complete locks and improvements for locks for displaceable wings that are not just limited to addressing the above described inadequacies of common Security and French Doors.

### **Summary of the Invention**

#### **Driver to operate remote bolts**

15 According to the invention there is a lock including a casing, a bolt supported in the casing to be displaceable between a fully extended position where the bolt protrudes from the casing and a retracted position in which it is substantially within the casing,

20 an angularly displaceable driver operably connectable to an upper remote engaging member by an upper vertically elongated drive member and/or connectable to a lower remote engaging member by a lower vertically elongated drive member,

at least one hand operable angularly displaceable lever having a free end and at least one angularly displaceable unlatching cam to operably connect the bolt and driver to the at least one lever,

25 wherein the bolt is displaceable towards the casing by downward displacement of the free end and each connected drive member is displaceable towards and away from the casing by displacement of the free end.

In forms of the invention, the pivotal axis of the diver intersects through the unlatching cam.

30 In forms of the invention, wherein the diver comprises a substantially annular member supported within a substantially circular recess.

#### **Exterior handle locking – and adapted locking slide**

According to the invention there is a lock including a casing, a bolt supported in the casing to be displaceable between a fully extended position where the bolt protrudes from the casing and a retracted position in which it is substantially within the casing,

operating means by which to displace the bolt towards the retracted position including an exterior and an interior hand operable lever operably connected to the bolt by angularly displaceable means,

5 an adapted locking slide and a hand operable locking member that is operable to displace the said adapted locking slide, said adapted locking slide being displaceable by the locking member to a third locked configuration corresponding to the exterior lever being locked to be restrained against displacement,

said adapted locking slide being displaceable from the third locked configuration to unlock the exterior lever by displacement of the interior lever.

10 In forms of the invention, wherein the angularly displaceable means comprises an angularly displaceable unlatching rocker.

**Exterior handle locking – and adapted dead locking slide**

According to the invention there is a lock including a casing, a bolt supported in the casing to be displaceable between a fully extended position where the bolt 15 protrudes from the casing and a retracted position in which it is substantially within the casing,

operating means by which to displace the bolt towards the retracted position including an exterior and an interior hand operable lever operably connected to the bolt by angularly displaceable means,

20 an adapted dead locking slide and a hand operable locking member that is operable to displace the said adapted locking slide, said adapted dead locking slide being displaceable by the locking member to a third locked configuration corresponding to the exterior lever being locked to be restrained against displacement,

25 said adapted dead locking slide being displaceable from the third locked configuration to unlock the exterior lever by displacement of the interior lever.

In forms of the invention, the angularly displaceable means comprises an angularly displaceable unlatching rocker.

**Cylinder displaces driver**

30 According to the invention there is a lock including a casing with sides, a bolt supported in the casing to be displaceable between a fully extended position where the bolt protrudes from the casing and a retracted position in which it is substantially within the casing,

35 an angularly displaceable driver operably connectable to an upper remote engaging member by an upper vertically elongated drive member and/or connectable to a lower remote engaging member by a lower vertically elongated drive member,

deadlocking means by which to restrain the bolt in the fully extended position including a key operable cylinder and a deadlocking slide that is connected by a deadlocking slide extension to the driver,

5 said deadlocking slide being displaceable by the cylinder to displace the driver whereby to displace each connected drive member towards and away from the casing.

**Automatically locking lock**

According to the invention there is a lock including a bolt comprising a latch bolt having an alternative associated auxiliary bolt supported in the casing, said bolt 10 being displaceable between a fully extended position where the bolt protrudes from the casing and a retracted position in which it is substantially within the casing,

operating means by which to displace the latch bolt towards the retracted position including an angularly displaceable unlatching rocker operably associated with an exterior and interior hand operable lever,

15 deadlocking means to restrain the latch bolt in the fully extended position including an alternative locking slide (without an unlatching ramped portion) biased towards the bolt and a cylinder including a key operable barrel that is operably connected to the alternative locking slide,

20 said alternative locking slide having a horizontally elongated ramped shoulder projecting towards the alternative auxiliary bolt with a horizontal engageable face, said alternative auxiliary bolt also includes a horizontally elongated ramped shoulder projecting towards to deadlocking slide with a horizontal engageable face projecting towards to deadlocking slide,

25 said alternative auxiliary bolt rearward end being biased and displaceable towards the alternative locking slide; the arrangement being configured such that in a pre-latching configuration, the engageable face of the alternative locking slide is above the engageable face of the alternative auxiliary bolt and the alternative locking slide abuts the bolt to be restrained by the bolt; in the third locked configuration the alternative locking slide lies behind the bolt to deadlock the bolt such that it cannot be 30 retracted by lever operation and the alternative auxiliary bolt is substantially depressed, at which time

35 the cylinder can be operated to displace the alternative locking slide to the undisplaced position during which displacement the ramped engageable horizontal face of the slide passes over the ramped engageable horizontal face of the auxiliary bolt by displacing the auxiliary bolt sideways against spring bias, said auxiliary bolt subsequently ramped engageable horizontal face being displaced towards the alternative locking slide to engage the said slide,

subsequent displacement of the auxiliary bolt as the auxiliary bolt displaces to the fully extended position causes the ramped engageable horizontal face of the bolt to displace from above the ramped engageable horizontal face of the alternative locking slide to thereby release the slide to assume the position corresponding to the 5 pre-latching configuration.

**Fixed door lock**

According to the invention there is a lock including a casing having a front plate, an angularly displaceable driver operably connectable to an upper remote engaging member by an upper vertically elongated drive member and/or connectable 10 to a lower remote engaging member by a lower vertically elongated drive member, at least one hand operable angularly displaceable lever having a free end and at least one angularly displaceable unlatching cam to operably connect the driver to the at least one lever, each connected drive member being displaceable towards and away from the casing by displacement of the free end,

15 said lock further including a locking plunger that protrudes from the front to be displaceable to engage in a recess in the driver whereby to restrain the driver against displacement.

**DESCRIPTION OF THE PREFERRED EMBODIMENTS**

**Definitions and Conventions Employed**

20 This specification and the provisional applications associated with this application, describe inventions comprising improved complete locks for displaceable wings and improvements for locks for displaceable that for convenience are referred to herein as locks.

So throughout this specification and claims which follow, unless the context 25 requires otherwise, the word "locks" or variations such as "lock" will be understood to imply the inclusion of complete locks for displaceable wings and improvements for locks for displaceable wings that are transportable into other locks and locking devices without being limited to the complete locks described herein.

This specification describes locks substantially as described herein with 30 reference to and as illustrated in the accompanying drawings.

Throughout this specification and claims which follow, unless the context requires otherwise, the word "comprise", or variations such as "comprises" or "comprising", will be understood to imply the inclusion of a stated integer or group of integers but not the exclusion of any other integer or group of integers.

35 Throughout this specification and claims which follow, unless the context requires otherwise, the positional prepositions such as rear, forward are used to

assist in description of the preferred embodiments and with reference to the accompanying drawings and have in general no absolute significance.

Throughout this specification and claims which follow, unless the context requires otherwise, the word "preferably" or variations such as "prefer" does not mean nor infer that that the inventions described in the "Description of the Preferred Embodiments" are restricted to the form of an integer or collection of integers that in some context is preferred. Preferably means, that of a number of acceptable alternatives, one is best suited to a particular purpose.

Throughout this specification and claims which follow, unless the context requires otherwise, the words wing embraces both doors and windows.

Throughout this specification, the very lightly printed numerals are to be ignored, being included only to facilitate reference to previous provisional applications.

Throughout this specification and claims which follow, unless the context requires otherwise: latching means displacement of an engaging member against biasing means by an engageable means and subsequent displacement of the engaging member into engagement with the engageable means under the action of the biasing means, (for hinged doors [within this application] this comprises displacement of a latch bolt or {latch bolt and an auxiliary bolt if there is an auxiliary bolt} towards the lock casing by the strike plate [and in conventional cases, by a curved or angled wing or lip of the strike plate] and subsequent displacement of the latch bolt into the aperture of the strike plate), (for sliding doors [within this application] this comprises displacement of a latch bolt with hooks or {latch bolt with hooks and an auxiliary bolt} towards the lock casing (as a result of the lock being displaced rectilinearly towards the catch plate) and subsequent displacement of the latch bolt with hooks into the aperture of the catch plate and displacement of the hooks outwardly to overlap the aperture's peripheral edge whereby to longitudinally engage the catch plate; within this application a bolt is displaceable between a fully extended position in which it is engageable within a strike plate aperture and a retracted position where it is removed from the aperture, (said retracted position coinciding with the bolt being substantially within the casing), (said fully extended position embracing a bolt that is substantially fully extended); a latch-bolt or latch bolt is an outwardly biased bolt capable of executing (or participating in) latching and having a leading end that is chamfered or otherwise profiled on one side to facilitate latching [in the context of this application] and a latch bolt also includes a prism shaped bolt that is restrained in a partly extended pre-latching configuration to facilitate latching, said prism shaped bolt in some forms including counter-acting

hooks, said prism shaped bolts in some forms having a leading end that is chamfered, curved or otherwise profiled on both sides to assist or facilitate latching; an **auxiliary bolt** means an outwardly biased plunger that is operably associated with the latch bolt; **unlatching** means withdrawal of the latch-bolt from engagement with the engageable means, (for hinged door it means withdrawal of the bolt from the aperture of the strike plate); an **unlatching lever** is a lever or knob that is hand operable to cause the latch-bolt to become unlatched; **locking** means configuring the lock to restrain it from being unlatched and in some forms of locks employing deadlocking slides, it includes restraining the deadlocking slide in an operative position to thereby restrain the bolt from being inwardly displaced by the unlatching lever; **deadlocking means** means to configure the lock to restrain the bolt from being displaced from the configuration that it assumes when engaged with the engageable means (in the case of a rectilinearly displaceable bolt for a hinged door, it means restraining the bolt in a fully extended position), the deadlocking means is some forms includes a **deadlocking slide** that is displaceable to cooperate with the bolt to restrain it against displacement; **deadlocked** means the bolt cannot be displaced from the extended position by external forces; **deadlatching** means the bolt is automatically deadlocked during latching; **remote lock** means a locking means disposed from the lock that includes a remote bolt that is operably connected to the lock (often there is an upper and a lower remote lock situated above and below the lock); **French door** means a door comprising a frame with a glass in-fill and often configured in pairs, a second door that is normally closed and is secured by vertical bolts and a first door that has the lock body and operable levers, often they have a strip of compressible sealing material located on the edge against which the first door closes to prevent energy loss, in may forms the door comprises a hollow frame where the hollow within the frame is comparatively small in depth, **security doors** means a door comprising a hollow framed door with an in-fill of mesh or woven stainless steel where the hollow within the frame is comparatively small in depth and in width; **lock body** is the lock portion fitted within the hollow frame of the wing, the lock body together with a strike plate, a pair of handle sets and a double cylinder comprising a typical mortice lock; **depth of lock body** is the extent of the lock body in a direction parallel to the face of the door; **width of lock body** is the extent of the lock body in a direction at right-angles to the face of the door; **free-rotation-cylinder** is a cylinder comprising a key operable barrel within a **cylinder housing** connected to a **first cam** (in one form having a radially protruding arm) with free movement; **free-rotation-double-cylinder** comprises a cylinder sub-assembly comprised of opposed barrels each connected with free movement to the same first cam such that the cam is free

(between limits) to be angularly displaced while the barrels remain undisplaced, this type of cylinder being commonly used in security door locks in Australia to enable the cam to be displaced by either barrel to a locking configuration and then the barrel to be reverse rotated to an undisplaced position enabling key removal while leaving the

5 first cam in the locking position, (this type of cylinder being distinct from the more commonly used double cylinders that employ clutches and that do not have free rotation between the barrels and first cam); **clutched-cam-double-cylinder** comprises a cylinder sub-assembly comprised of opposed barrels each connectable without free movement to the same first cam such that the cam can be angularly  
 10 displaced by a barrel while the other barrel remain undisplaced, the cylinder includes a clutch to select which barrel is the operative barrel, said clutch being operated by key insertion. In forms of both clutched and free rotation cylinders, the interior key operable is replaced by a hand and operable turn knob.

#### Description of the Figures

15 Embodiments of the present invention will now be described by way of example only with reference to the accompanying drawings in which:

Fig 1 is a schematic side view of a lock body with the lid removed and placed beside the lock body, with the bolt fully extended, the unlatching cam at the "undisplaced orientation" and the deadlocking slide is downwardly disposed to enable  
 20 the cylinder cam arm to enter the deadlocking slide drive recess,

Fig 2 is the lock of Fig 1 but with the deadlocking slide upwardly displaced by the cylinder screw to be in the "undisplaced position",

Fig 3 is the lock of Fig 2, but with the deadlocking slide further upwardly displaced to deadlock the bolt in the "second locked configuration".

25 Fig 4 is the lock of Fig 3, but with the deadlocking slide further upwardly displaced to deadlock the bolt in the "first locked configuration".

Fig 5 is the lock of Fig 4 from the underside with the side removed,

Fig 6 is the lock of Fig 1 with the deadlocking slide in the "undisplaced position" and the bolt displaced to the retracted position by the unlatching cam

30 Fig 7 is the lock of Fig 1 with the deadlocking slide in the "undisplaced position" and the bolt in the "pre-latching configuration"

Fig 8 is the lock of Fig 1, with the bolt fully extended, the deadlocking slide in the "undisplaced position" position, each unlatching cam displaced anticlockwise, and the drive slides fully displaced,

35 Fig 9 is the lock of Fig 8, with each unlatching cam returned to the "undisplaced position" and the drive slides fully displaced,

Fig 10 is an isometric view of the lock of Fig 9 with Bowden Cable attached

Fig 11 is an exploded view of the lock of Fig 1

Fig 12 is the lock of Fig 10 from the underside with the side removed with Bowden Cable attached,

Fig 13 is an isometric view of the lock of Fig 12,

5 Fig 14 is an exploded isometric view from the underside of the lock of Fig 11,

Fig 15 is the lock of Fig 3, but adapted to provide exterior lever locking and including an adapted locking slide – the lock being shown in the “third locked configuration”,

10 Fig 16 is the lock of Fig 3, but adapted to provide exterior lever locking and including an adapted dead locking slide – the lock being shown in the “third locked configuration”,

Fig 17 is the lock of Fig 16, with the interior unlatching cam angularly displaced to partly retract the bolt,

Fig 18 is an isometric view of the lock of Fig 17

15 Fig 19.1 is the lock of Fig 3, but adapted to provide deadlatching and including an automatic alternative deadlocking slide – the lock being shown with the bolt fully extended and the deadlocking slide in the “second locked” configuration,

Fig 19.2 is an underside view of the lock of Fig 19.1

Fig 19.3 shows the lock of Fig 19.1 unlocked

20 Fig 20 is the lock of Fig 19, but in the pre-latched configuration,

Fig 21 is an isometric view showing the lock body and underside of the exterior handle assembly,

Fig 22 is an isometric view of forms of bolts and a strike plate

Fig 23 is an isometric view of a bolt with hooking arms showing the bolt in a 25 retracted position,

Fig 24 shows the bolt of Fig 23 in a fully extended position,

Fig 25 is a plan view of the bolt of Fig 24

Fig 26 is an isometric view of a wing with a lock supported adjacent an opening,

30 Fig 27 is an isometric view of handles and a lock body.

Integers from which locks are comprised include a **bolt 1**, a **front plate 2** and a **casing 3** 2 that in some forms comprises **sides 4** 3 attached to each other by internal **fixed portions 5** 4 by **rivets 6** 6A comprising extensions of the fixed portions that have passage through **apertures 7** 6B in the casing sides. The front plate is

35 preferably attached by **screws 8** 6 having passage through **apertures 9** 7 in the front plate to engage in **recesses 10** 8 in the fixed portions, while in other cases a **spacer 11** 9 is between the front plate and sides to provide a lock of increased backset.

In other forms, the front plate, the internal fixed portions and a side comprise a single member such as a single casting to which a separate side is attached.

The bolt comprises a **first portion** 12 11 that is displaceable from the casing through a **bolt aperture** 13 12 in the front plate and a **return portion** 14 13 within 5 the casing by which the bolt is supported. In some forms, the first portion comprises a substantially prism-like solid as shown in *Fig 11*, while in other forms the first portion comprises substantially half a solid prism having a bevel on one side that extends from top to bottom and from the **end** 15 14 of the bolt to the portion adjacent the bolt aperture in the front plate of the fully extended bolt, i.e. as is common in bevelled 10 latch bolts.

In other forms again, the first portion comprises a substantially prism-like solid having a slot, in which is supported a pair of counter-acting pivotally displaceable hooking arms that are displaced from the bolt as the bolt displaces to the fully 15 extended position. This form of bolt preferably has a pre-latching configuration to facilitate latching. In some forms of this bolt, there is a vertical **slot** 16 extending from top to bottom and each hooking arm is displaced from the upper and lower edges of the bolt. In other forms of this lock, the first portion comprises a substantially prism-like solid having a **horizontal slot** 16 extending from one side to the other side in which each (of a pair of counter-acting pivotally displaceable) **hooking arms** 17 is 20 supported to be displaceable from a side of the bolt as the bolt displaces to the fully extended. The above described bolt is suitable for use in locks for both hinged doors when used with a strike plate and sliding doors when used with catch plate.

The hooked arms comprise a horizontal **hooking arm** 18 terminating at the inner end with a sideways protruding **control shoulder** 19 117 and at the other, 25 outer end, (in a form of the arm) in a **hook** 20 118 that is displaceable from within the bolt as shown in *Fig 23* to protrude from the side of the bolt, to engage behind the **aperture edge** 21 within a **catch plate** 22 or **strike plate** 23 whereby to become longitudinally engaged. The arms are supported by a vertical **pin** 24 19 that has 30 passage through an aperture in each arm, said pin defining the vertical pivotal axis of each arm.

The hooked arm is configured such that as the bolt displaces towards the fully extended position, each control shoulder is brought into contact with the **inside face** 25 121 of the front plate 2 and as the bolt further extends, the arm is forced inwardly by the front plate aperture 13 to displace the hook 20 outwardly – the front plate 35 **aperture edge** 26 exerting a moment on each arm to displace it.

When the bolt is displaced towards the retracted position from the fully extended and engaged configuration, the strike plate or catch plate aperture edge 21

acts on the hooks (or ramped surface) to displace the hooks into the bolt envelope where they are retained by the front plate aperture edge 26 – the hooked arm being so restrained when the bolt is in the pre-latching configuration and until the hooks have entered the strike plate or catch plate aperture during latching.

5 In other forms, each hook is replaced by a ramped shoulder 27 122.

The width  $w_1$  28, of the bolt first portion is preferably of reduced width to be less than the width of the bolt return portion  $w_2$  29 so that the bolt with outwardly displaced control shoulders as shown in Fig 23 can displace within the sides of the casing, i.e. within a width of ( $w_2$  plus working clearances)

10 In some locks, the corners 30 of the upper and lower edges of the bolt aperture are radiused to provide increased front plate strength and the upper and lower edges 31 of the bolt are configured to conform to the aperture profile with working clearances

The bolt (having a first portion substantially comprising a prism-like solid) in

15 some forms comprises an outwardly biased latch bolt, that in some forms has the leading end 15 profiled on both sides to facilitate latching wherein the leading portion is chamfered and/or curved, or otherwise profiled on each side to assist latching wherein the latch bolt is engageable on either side by a strike plate 23 to be inwardly displaced by the strike plate during latching, said profiling in some forms comprising  
20 a simple radius on the edge defining the junction between the side of the bolt and the outer end of the bolt, said profiling accommodating both left hand and right hand doors, as shown in Fig 27

Where the bolt having a first portion substantially comprising a prism-like solid that in the fully extended position extends so far as to not be able to engage with the  
25 strike plate to be inwardly displaced by the strike plate to effect latching, the lock includes means to restrain the bolt in a partly extended pre-latching configuration from which it is able to engage with the strike plate to be inwardly displaced to effect latching. In forms of locks where the fully extended bolt extends beyond the wing or curved lip 32 of a conventional strike plate, the bolt preferably has the partly  
30 extended pre-latching configuration.

Some locks (and even those having a bolt with a chamfered side for latching) have a partly extended pre-latching configuration to improve latching even though this it is not essential for latching.

In one form the (means to provide pre-latching) includes an outwardly biased auxiliary bolt 33 comprising a first auxiliary bolt portion 34 18 that protrudes from the front plate and that is displaceable into the casing through an auxiliary bolt aperture 35 19 in the front plate and a return auxiliary bolt portion 36 20 within the

casing by which it is supported. In some forms of locks, the auxiliary bolt in some forms is outwardly biased by the compression spring 37 17 that acts between the outer end 38 of a spring recess 39 in the auxiliary bolt and a vertical wall 40 of a casing fixed portion.

5 The first auxiliary bolt portion in some forms comprises a prism-like member having a leading end 41 21 profiled on both sides to accommodate both left hand and right hand doors wherein the profiled portion on each side is curved, chamfer or otherwise profiled to facilitate latching wherein the auxiliary bolt is engageable on either side by a strike plate to be inwardly displaced by the strike plate during  
10 latching.

The return portion 36 20, as shown in Fig 1, has a sideways protruding shoulder preferably comprising a cylindrical pin 42 23 that engages within an aperture of an adjacent control slide 43 24 that is located within the casing adjacent a side wall to be vertically rectilinearly displaceable. The control slide aperture  
15 includes an upwardly ramped slot 44 having an upper ramped edge 45 25 that lies in the same vertical plane as the pin 42 23. The parts are configured such that as the auxiliary bolt is inwardly displaced the pin 42 23 slides along the ramped shoulder 4525 to urge the control slide away from the bolt to displace a control shoulder 46 of the control slide away from the bolt to enable it to be displaced to the fully  
20 extended position by biasing means derived from spring 47 27 as will be explained in more detail below. The control slide at the leading end has the control shoulder 46 that is engageable in a edge recess 48 28 in the under-edge of the bolt that comprises a horizontally elongated slot extending from a substantially vertical slot end 49 towards the outer end of the bolt – preferably the slot does not extend  
25 sideways to the surface of the bolt.

The ramped slot is also defined in-part by a lower ramped edge 50 25B that lies in the same vertical plane as the pin 42 23. The parts are configured such that as the auxiliary bolt is outwardly displaced the pin 42 23 slides along the upper ramped shoulder 50 25B to urge the control slide towards the bolt to displace the control shoulder of the control slide towards engagement with the bolt. In some forms of locks the aperture in the control slide includes a substantially horizontal elongation 51 to accommodate additional displacement of the auxiliary bolt.

It should be noted that when the front plate is removed one control slide can be substituted for another whereby to change the distance the auxiliary bolt and latch bolt protrude front the front plate in the pre-latching configuration.

In normal usage, the bolt is fully retracted by unlatching lever operation and the wing is opened whereby to enable the auxiliary bolt to outwardly displace till it is

restrained by the control slide itself restrained by abutting the bolt. As the unlatching lever is then reversed towards the undisplaced position, the bolt outwardly displaces during which displacement the control shoulder is displaced by the auxiliary bolt into the under-edge recess to restrain the bolt in the pre-latching configuration.

5        Integers include an unlatching rocker 52 30 as shown in Fig 1, that is angularly displaceable about a pivotal axis 53 32 orthogonal to the sides of the casing and that is supported by a shaft 54 that in some forms comprises a pinned extension of the casing and in other forms comprises a rivet 55 31 that passes from one side of the casing to the other to both support the rocker and fasten the sides of  
 10      the casing, said unlatching rocker having a first arm 56 33 extending upwardly from the pivotal axis to terminate in an engageable shoulder 57 34 while the second arm 58 35 extends downwardly to overlap the return bolt portion so that the bolt is inwardly displaceable by anti-clockwise angular displacement of the unlatching rocker. In forms of the invention, the overlapping second arm portion includes a  
 15      sideways protruding drive pin 58 36 as shown in Fig 11, that locates in a drive recess 59 37 in a side of the bolt.

Integers include means to outwardly bias the latch bolt comprising a spring that in a form of the invention comprises a compression spring 60 27 that acts directly on second arm of the rocker to outwardly bias the bolt by outwardly biasing the second rocker arm, while in other forms of locks (and those that do not provide deadlatching) the spring acts directly on the bolt. The rear end of the spring in forms of the invention is seated in a circular spring recess 61 in the casing rear wall and coaxial with this recess and the spring is an elliptical aperture 62 (defined by the general equation  $x^2/a^2 + y^2/b^2 = c^2$  where the major diameter is substantially the same  
 20      as the outer diameter of the spring and substantially the same as the diameter of the spring recess, said elliptical recess having passage through the rear of the casing to enable the spring to be loaded into the casing after the lock body has (otherwise) been assembled by twisting the spring so that it takes a form having an elliptical cross-section that can be inserted through the elliptical aperture whereby to resume  
 25      30      its normal shape once within the casing, whereupon the rear end of the spring deforms to become seated within the spring recess.

Integers include operating means by which to displace the bolt towards the retracted position including at least one unlatching cam 62 39 connected to an external hand operable lever 63. In some forms of the invention, the unlatching cam and lever are connected by a shaft that extends between the lever (said lever being part of a handle assembly 64 44 mounted to the face of the wing) and a mating drive aperture 65 43 in the unlatching cam. The unlatching cam has a downwardly

extending unlatching arm 66 45 that has towards the free end a driving shoulder 67 46 that is rearward of the rocker first arm and within the same plane such that downwards lever operation displaces the driving shoulder clockwise to displace the drive rocker in an anti-clockwise direction to cause the bolt to retract. The unlatching 5 cam is preferably supported by at least one sideways protruding cylindrical portions 68 47 as shown in Fig 14 and 11 that extends into a circular aperture 69 47A in a side of the casing and the cylindrical portion also preferably includes the shaft drive aperture 65 43 to receive and mate with the shaft.

In some forms of the invention the unlatching cam and lever are connected by 10 a shaft that extends between an exterior lever 70 41 and an interior lever 71 42 as shown in Fig 27, while having passage through the mating drive aperture in the unlatching cam or mating drive recesses in a pair of unlatching cams if the lock has a lockable exterior lever.

In some forms of locks, the exterior lever can be independently locked from 15 the interior by a locking member 73 (that may comprise a locking lever) described below and these locks can be simultaneously unlocked and unlatched by operation of the interior lever. This functionality requires the lock to include an exterior lever connected to an outer unlatching cam 74 48 by an exterior shaft 75 49 and an interior lever 76 connected to an inner unlatching cam 77 50 by an interior shaft 20 78 51 (each said shaft mating without free movement with its respective associated unlatching cam and lever) each said unlatching cam preferably being supported adjacently each other and each having both an unlatching arm as described above and a drive arm as described below – and each is independently operable to retract the latch bolt.

25 Integers include an interior hand operable locking member 73 as shown in Fig 27, that is operably connected to a deadlocking slide 79 as described below whereby to be operable to actuate the deadlocking slide to and from a second locked configuration, said locking member in one form comprising an angularly displaceable locking lever 83 (also called a snib-lever) that is connected by a spindle 84 53 to an angularly displaceable locking cam 85 54 having a spindle aperture 86 55 and a locking arm 87 56. said locking arm having a displaceable free end 88 that is engaged (with free movement) within a recess 89 in a side of the deadlocking slide. In forms, the locking cam 85 is supported by cylindrical portions 90 54A that are within circular apertures 91 54B in the sides of the casing, and in other forms the 30 locking arm has a sideways protruding pin that engages in a horizontal slot in the deadlocking slide. The locking lever is configured such that it cannot be displaced to displace the deadlocking slide further than a second locked configuration or third 35 locking configuration.

locked configuration described below – the rotation of the locking cam being limited by engagement between portion 92 and a rear portion of the casing.

Integers further include the deadlocking slide to restrain displacement of the bolt to the retracted position. In some forms of the deadlocking slide as shown in Fig ,

5 the deadlocking slide has a **leading end** 93 58 that is co -operable with the fully extended bolt to restrain the bolt from being displaced from the fully extended position. In some forms, the deadlocking slide has an **engaging shoulder** 94 58A that is engageable behind an **engageable shoulder** 95 59 of the bolt (and that lies in the same vertical plane (a plane parallel a casing side) as the engageable shoulder 95 of the bolt) – the configuration in which the bolt and slide cooperate being referred to herein as the deadlocking configuration and when so engaged the deadlocking slide can be said to be in a deadlocking position [this deadlocking position actually comprises a limited range of deadlocking slide positions over which the bolt and slide so cooperate]. The engageable shoulder preferably comprises a vertical shoulder 10 defined in-part by a change in the width of the bolt at the junction between the first and return portions of the bolt – the first portion being of greater width than the return portion.

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The deadlocking slide leading end in some forms comprises an inwardly ramped portion engageable with the lower corner of the engageable shoulder such 20 that displacement of the deadlocking slide towards the bolt causes the ramp to slide over the corner to cause the bolt to be outwardly displaced (if the bolt is not fully extended when the deadlocking slide is displaced towards the bolt).

Integers further includes an angularly displaceable **first cam** 96 61 as shown 25 in Fig , (having a radially protruding **cam arm** 97 62) that in some forms of locks is supported within the casing by the sides of the casing as occurs in the lock of [Watts AU 696343] to be operable by a barrel supported within each handle portion, per [Watts AU 696343] herein being included by reference, and in other forms, the first cam is connected to a hand operable member that in some forms comprises an operable knob. The first cam in some forms of locks is as described in [Watts 30 AU706589] which is included herein by reference, said first cam in some forms of locks comprising part of a sub-assembly comprising a **free-rotation-cylinder** 98 63 as shown in Fig 15, defined above and that is assembled to the lock body as a whole and wherein the first cam is supported within the casing adjacent the deadlocking slide as shown in the figures. The first cam of the free-rotation-cylinder in some forms 35 is connected to a key operable single cylinder on each side but in other forms it is connected to a hand operable member on one side that in some forms comprises an operable knob.

The first cam is operably connected to the deadlocking slide by a drive recess 99 64 having an upper drive face 100 65 on which the first cam arm acts to drive the deadlocking slide towards the deadlocking configuration and having a lower drive face 101 66 on which the first cam arm acts to drive the deadlocking slide from the deadlocking configuration and an exit shoulder 102 67 (in some forms comprising an angled face) connected to the upper drive face disposed such that when in the deadlocking slide is in the first locking configuration, the first cam end face 103 68 (a face of constant radius) is adjacent the exit shoulder such that the force that is applied to the first cam by the deadlocking slide when an attempt is made to move the deadlocking slide from the deadlocking configuration (as might occur in an attempt to rotate the snib lever) has a direction that passes through the pivotal axis 104 69 of the cam and so the cam cannot be rotated and the first cam in this configuration restrains the deadlocking slide.

In some forms of locks, there are two locking modes: a second locked mode into which and from which the lock can be displaced by actuation of an interior locking lever and by actuation of the first cam, and a first locked mode into which the lock can be displaced by actuation of the first cam and from which it can be displaced by only the first cam. In some forms of locks there is an exterior locking lever, as described in [Watts AU 18474/2000] that hereby included by reference, that is operable to displace the lock into the second locked mode but which is not operable to displace the lock from the second locked mode.

In forms of locks, the second locked mode, as shown in Fig 3 is characterized by the first cam arm being within the drive recess and the deadlocking slide having been displaced into the deadlocking configuration by the locking lever or by the first cam, and the first locked mode as shown in Fig 4, characterized by the deadlocking slide being displaced into the deadlocking configuration and the first cam arm being displaced from within the drive recess to restrain the deadlocking slide in the deadlocking configuration from which the deadlocking slide cannot be displaced by the locking lever.

In some forms of the invention, the deadlocking slide supports a spring loaded ball 105 70 that is engageable in recesses 106 71, 107 72, 108 73 in a side of the casing corresponding to an undisplaced deadlocking slide, a deadlocking slide in the second locking configuration and a deadlocking slide in the first locking configuration and in deadlatching forms, the recess 106 and 107 are connected by a vertically elongated slot to comprise recess 109 74 of Fig 16

Where the cylinder comprises a double free-rotation-cylinder a cylinder screw 110 is employed to restrain the lock cylinder within the lock body, said screw

having passage through a screw aperture 111 in the front plate and being engageable in a threaded aperture 112 in the lock cylinder, and in these forms the screw also performs the function of restraining the first cam within the drive recess by restricting the downward displacement of the deadlocking slide from the undisplaced position.

5 position. In usage, after the cylinder has been inserted in the cylinder aperture in the lock body, the first cam is rotated to be within the drive recess at which time the cylinder screw is inserted to displace the deadlocking slide away from the initial position and to the undisplaced position (corresponding to the ball being in aperture 106) that does not allow the first cam to be displaced downwardly to leave the drive

10 recess.

In forms where the cylinder comprises a fixed cam cylinder, the first cam is operated by being rotated 360 degrees and in locks employing such cylinders, the lock does not include the locking lever, locking cam (and exterior locking lever) and the first cam is given space to fully rotate. In this case during locking, the first cam

15 leaves the drive recess, passes over the exit face and comes to rest in the initial undisplaced position enabling key removal. In this case, the spring-loaded ball is engageable in recesses corresponding to an undisplaced slide and a slide in the first locked configuration.

In some forms of locks as shown in Fig , the exterior lever can be

20 independently locked from the interior by the interior locking-lever and simultaneously unlocked and unlatched by operation of the interior lever. As with many of the improvements described herein that are transportable into other locks, this functionality can readily be transported into security door locks that include a deadlocking slide and a locking snib such as described in [Watts AU706589] and

25 [Lockwood 12029/88].

Some forms of locks, include a lockable exterior lever connected to an outer unlatching cam by an exterior shaft and an interior lever connected to an inner unlatching cam by an interior shaft as described above - each said unlatching cam having both an unlatching arm and a drive arm and each being independently

30 operable to displace the unlatching rocker to retract the latch bolt and each being independently operable to actuate the driver annulus described below.

In these forms of locks the spindle of the locking lever has passage through the lock body to mate within a lever locking cam 113 76 supported on the underside of the exterior lever backplate 114 77 and the deadlocking slide described above is adapted to comprise either an adapted locking slide or an adapted deadlocking slide as described below.

The adapted locking slide 115 79 includes a ramped **unlocking shoulder 116 78** that in the **third locked configuration** (a configuration otherwise corresponding to the second locked configuration described above) is rearwardly disposed of the latch bolt and that is engageable by an inwardly displacing bolt to 5 cause the deadlocking slide to downwardly displace to cause the locking cam to be rotated in an anticlockwise direction to actuate the lever locking cam in an unlocking direction.

In some forms of locks where the bolt is deadlocked by the deadlocking slide when the lock is in the third locked configuration as shown in Fig 16, the deadlocking 10 slide comprises an adapted deadlocking slide 117 that includes a **deadlocking shoulder 118 80** that lies in the same vertical plane (a plane parallel a casing side) as the engageable shoulder of the bolt, and adjacent to the ramped **unlocking shoulder 116** that lies in the same plane (a plane parallel a casing side) as the unlatching rocker, such that in the **third locked configuration** both shoulders are 15 rearwardly disposed of the bolt, the deadlocking shoulder to restrain the bolt from being inwardly displaced and the unlatching rocker to be displaced by the unlatching rocker whereby to retract the bolt. The unlocking shoulder is engageable by a **nose portion 117 81** of the second arm of the unlatching rocker as it rearwardly displaces to retract the latch bolt. The unlatching rocker is outwardly biased by a **spring 119 27** 20 supported within a **spring recess 120 27A** in the casing and that acts directly on a protruding **pin 121 82** of the rocker second arm, as shown in Fig 17, to outwardly bias the rocker and the drive pin of the rocker acts within the bolt drive recess to outwardly bias the bolt - the bolt recess being enlarged to provide the rocker sufficient free movement to displace rearwardly (while the bolt remains undisplaced) 25 to enable the nose portion to displace the unlocking shoulder whereby to displace the deadlocking shoulder from behind the engageable shoulder to enable the bolt to inwardly displace.

The second arm, deadlocking slide and bolt are preferably configured such that displacement of the bolt to a partly retracted position corresponds to the 30 deadlocking slide having been displaced to the undisplaced position. The lock is preferably further configured such that the undisplaced position of the deadlocking slide corresponds to an undisplaced locking cam and to an undisplaced locking lever and an undisplaced lever locking cam and an unlocked exterior lever.

The lever locking cam supported coaxially with the spindle on the underside 35 of the exterior lever backplate, has an arm 122 84 by which the cam and spindle and locking cam are operably connected to a **stop blade 123 83** that is upwardly displaceable by spindle rotation to engage in a **stop slot 124 85** of a **stop washer**

125 86 attached coaxially to the shaft portion of the exterior lever. The components are configured such that when the locking lever and spindle are undisplaced, the exterior lever is unrestrained but if the deadlocking slide is in the third locked configuration, the stop blade is within the stop recess restraining the exterior lever

5 against displacement. In usage, when the interior lever is pushed down to retract the bolt, the deadlocking slide is displaced to angularly displace the locking cam to angularly displace the spindle to unlock the exterior lever. As will be appreciated, the exterior lever can also be unlocked by the cylinder from either side and by the locking lever.

10 The stop blade preferably comprises a part of a rectilinearly displaceable **stop slide** 126 83A supported between the **side walls** 127 of the exterior back plate and biased by **compression spring** 128 83B away from the stop washer – said spring being supported within a vertically elongated spring slot 129 of the stop slide to act downwardly on the **lower end** 130 of the spring slot while acting upwardly on a screw 131 that intersects the spring slot to retain the slide adjacent the back plate.

15 There are preferably a pair of horizontally opposed arms disposed on opposite sides of the **spindle pivotal axis** 132, each arm terminating in an engaging profiled **shoulder** 133 76B and the **horizontal lower edge** 134 of the stop slide includes a pair of **recesses** 135 83C one recess engageable by a shoulder 133 and

20 the other recess engageable by the other shoulder 133. When the stop slide is undisplaced, each shoulder abuts the horizontal lower edge of the stop slide and when the lever locking cam is in a displaced position corresponding to the third locked configuration, one of the shoulders 133 is within a recess 135. The recesses and shoulders are configured such that the stop slide biased by spring cannot

25 dislodge a shoulder from its recess (this being possible by spindle rotation alone) because the vector defining the normal to the surface of the recess at the point of contact by the shoulder is configured to pass through the pivotal axis of the lever locking cam.

30 It will be appreciated that this arrangement also biases the locking lever towards an undisplaced position.

In some forms of locks (that have a pre-latching configuration), the locks have a **deadlatching bolt** 136 that automatically deadlocks each time it extends to the fully extended position. In these forms of the invention the locking cam and locking member may be omitted and the deadlocking slide comprises an alternative

35 **deadlocking slide** 137 similar to the deadlocking slide but biased by compression **spring** 138 as shown in Fig towards the second locked configuration, and the ball is provided with the vertically elongated recess (described above) in which to

unrestrainedly displace and the alternative deadlocking slide includes a vertically elongated **spring recess** 139 to house the spring. The alternative deadlocking locking slide has a horizontally elongated **ramped shoulder** 140 projecting towards the alternative auxiliary bolt that includes a horizontal **engageable face** 141.

- 5        The alternative auxiliary bolt is similar to the auxiliary bolt but has a rearwardly projecting **blade portion** 142 that passes beside the alternative deadlocking slide and that has a horizontally elongated **ramped shoulder** 143 projecting towards the deadlocking slide with a horizontal **engageable face** 144 projecting towards the alternative deadlocking slide. The alternative auxiliary bolt is
- 10      outwardly biased by a **torsion spring** 145 supported about a sideways protruding **pin** 146 being an extension of a casing fixed portion - this means of biasing the auxiliary bolt can also be applied to all the locks described above. The spring has a **spring arm** 147 that lies behind the sideways protruding pin of the alternative auxiliary bolt. The blade is biased and displaceable towards the alternative locking
- 15      slide as a result of the auxiliary bolt being restrained against outward displacement by the auxiliary bolt spring by a **shoulder** 148 on only one side of the bolt - this arrangement causing the bolt to be urged to rotate about the shoulder 148.

The lock is configured such that in the pre-latching configuration, the engageable face of the alternative locking slide is above the engageable face of the alternative auxiliary bolt and the alternative locking slide abuts the bolt to be restrained by the bolt. When the wing is closed the bolt is displaced to the fully extended position and the alternative deadlocking slide is displaced to the second locking configuration while the alternative auxiliary bolt is retained depressed. In this locked configuration the alternative locking slide lies behind the bolt to deadlock the bolt such that it cannot be retracted by lever operation and the alternative auxiliary bolt is depressed.

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When in the second locked configuration, either the (cylinder - if included) or (locking lever - if included) can be operated to displace the alternative deadlocking slide to the undisplaced position during which displacement the ramped engageable horizontal face of the dead locking slide passes over the ramped engageable horizontal face of the alternative auxiliary bolt by displacing the blade of the auxiliary bolt sideways, after which the blade portion of the auxiliary bolt displaces towards the alternative locking slide to engage the said slide and retain it until such time as the alternative auxiliary bolt is depressed. When the auxiliary bolt displaces to the fully extended position as occurs when the wing is opened, the ramped engageable horizontal face of the auxiliary bolt displaces outwardly from above the ramped engageable horizontal face of the alternative locking slide to thereby release the slide

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to assume the position corresponding to the pre-latching configuration where the alternative deadlocking slide abuts the bolt.

~~The~~ further includes drive means to operate an upper and/or a lower remote engaging member, said drive means including one and in forms of the

5 invention, a pair of counteracting drive slides operably connected to an angularly displaceable driver 149 90 as shown in all the figures that in one form comprises a driver annulus 150 91 having a base 151 supported within the casing and in some forms of the invention supported within a raised annular wall 152 92 that completely or partly surrounds the drive annulus, said annular wall being supported by or

10 comprising part of the casing.

In a form of the invention, the driver member at a position disposed from its pivotal axis is connected to an upper drive slide 153 94 by a first joint 154 95 as shown in Fig , and in some forms the drive member is connected at a position disposed from its pivotal axis to a lower drive slide 155 by a second joint 156 96 as

15 shown in Fig , and in some cases the driver is connected to both upper and lower drive slides. The joints provide relative angular displacement between the driver and the upper drive slide and in one form comprise a pin-joint 157 comprising a pin 158 extending sideways from within apertures in the slide and driver member and having angular free movement relative to at least one. In some forms, the first and second

20 joints are an equidistance (a radius  $r$ ) from the driver pivotal axis 159 and on opposite sides of the pivotal axis and in some forms, the joints and pivotal axis are in the same horizontal plane when the driver is angularly disposed half way between the undisplaced and fully displaced positions. In forms of the invention shown in the figures, the first joint is rearwardly disposed of the pivotal axis and the second joint is

25 forwardly disposed and the joints are on opposite sides of the driver member as shown.

In other forms, the joint comprises a sideways protruding pin disposed relative to the driver that extends into a substantially horizontal slot of the drive slide.

In forms of the invention, the driver and each unlatching cam are closely

30 disposed (to require less space within the casing and for other reasons) with this proximity being defined in-part by the pivotal axis of the driver intersecting the unlatching cam and accordingly the cylindrical portions of each unlatching cam is supported in an aperture in a casing side walls that is within a circumference defined by the radius  $r$  (defined above) and in cases where the driver member takes the

35 form of a driver annulus, each unlatching cam is within the driver annulus.

The driver has a locking shoulder 160 100 and an unlocking shoulder 161 101 that in a form of the member shown in the figures, is defined in-part by a recess

Integers further includes drive means to operate an upper and/or a lower remote engaging member, said drive means including one and in forms of the invention, a pair of counteracting drive slides operably connected to an angularly displaceable driver 149 90 as shown in all the figures that in one form comprises a 5 driver annulus 150 91 having a base 151 supported within the casing and in some forms of the invention supported within a raised annular wall 152 92 that completely or partly surrounds the drive annulus, said annular wall being supported by or comprising part of the casing.

In a form of the invention, the driver member at a position disposed from its 10 pivotal axis is connected to an upper drive slide 153 94 by a first joint 154 95 as shown in Fig , and in some forms the drive member is operably connected at a position disposed from its pivotal axis to a lower drive slide 155 by a second joint 156 96 as shown in Fig , and in some cases the driver is connected to both upper and lower drive slides. The joints provide relative angular displacement between the 15 driver and the upper drive slide and in one form comprise a pin-joint 157 comprising a pin 158 extending sideways from within apertures in the slide and driver member and having angular free movement relative to at least one. In some forms, the first and second joints are an equidistance (a radius  $r$ ) from the driver pivotal axis 159 and on opposite sides of the pivotal axis and in some forms, the joints and pivotal 20 axis are in the same horizontal plane when the driver is angularly disposed half way between the undisplaced and fully displaced positions. In forms of the invention shown in the figures, the first joint is rearwardly disposed of the pivotal axis and the second joint is forwardly disposed and the joints are on opposite sides of the driver member as shown.

25 In other forms, the joint comprises a sideways protruding pin disposed relative to the driver that extends into a substantially horizontal slot of the drive slide.

In forms of the invention, the driver and each unlatching cam are closely disposed (to require less space within the casing and for other reasons) with this proximity being defined in-part by the pivotal axis of the driver intersecting the 30 unlatching cam and accordingly the cylindrical portions of each unlatching cam is supported in an aperture in a casing side walls that is within a circumference defined by the radius  $r$  (defined above) and in cases where the driver member takes the form of a driver annulus, each unlatching cam is within the driver annulus.

The driver has a locking shoulder 160 100 and an unlocking shoulder 161 101 that in a form of the member shown in the figures, is defined in-part by a recess 35 162 there between. Each said shoulder is engageable by each drive arm 163 102 comprising a radial extension of each unlatching cam and they are spaced such that

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162 there between. Each said shoulder is engageable by each drive arm 163 102 comprising a radial extension of each unlatching cam and they are spaced such that when the driver member is undisplaced and each unlatching lever is undisplaced, each drive arm abuts the locking shoulder 160 and when the lever is lifted to fully 5 displace the driver member (to actuate the drive slides to operate remote locks) each drive arm engages the locking shoulder 160 to displace it downwardly as shown in Fig 8, and when the lever is then returned to the undisplaced position each drive arm abuts the unlocking shoulder 161 as shown in Fig 9. When the lock is unlatched 10 by pushing the lever down, a drive arm displaces the unlocking shoulder 161 to the undisplaced position to unlatch remote locks during which displacement the unlatching rocker is displaced to cause the latch bolt to retract. Preferably, the fully retracted latch bolt coincides with an undisplaced driver member.

In forms of locks, the drive slides comprise vertically rectilinearly displaceable slides positioned towards the rear of the casing and in these forms, the second joint 15 is connects by an angled intermediate member 163 103 to the free end 164 104 of an intermediate rocker 165 105 by a pin-joint 166 107, said rocker extending from a pivotal joint 167 106 shared with the casing (and located adjacent the front plate) to its free end 168 disposed rearwardly of the casing. The free end also shares a pin joint 169 108 with a rearwardly disposed lower drive slide 170 109 that extends 20 from the pin joint 169 towards the lower end of the casing. The intermediate member and rocker each have a pivotal orthogonal to a side of the casing.

In normal usage, rotation of the driver annulus in a locking direction (anti-clockwise) by lifting the free end of an unlatching lever drives the upper drive slide upwardly and the lower drive slide downwardly by causing the intermediate member 25 to pull the rocker downwardly. Preferably the upper and lower drive slides displace simultaneously in opposite directions and preferably the total displacement of each is identical (although at any intermediate position this may not be so) and so preferably the lengths of the intermediate member, the length of the rocker and the location of the joints are configured to provide such. Rotation of the driver member in a 30 unlocking and unlatching direction (clockwise) by lowering the free end of an unlatching lever drives the lower drive slide upwardly and the upper drive slide downwardly.

In some forms of locks, the deadlocking slide is connected to a vertically elongated driver locking slide 171 110 that has a stop shoulder 172 111 that is 35 displaceable into a driver locking recess 173 112 of the driver to restrain it from being displaced from the fully displaced position corresponding to fully outwardly

displaced drive slides – this restrained configuration corresponding to a first locked configuration of the lock.

In some forms of locks, there is also a **subsidiary locking recess 174 113** of the driver that is utilized to restrain it from being displaced from the undisplaced position (corresponding to retracted drive slides and a lock in the first locked configuration) – this form of locking being additional to the locking provided by the deadlocking slide cooperating with the bolt as described above and wherein when the bolt is restrained by the deadlocking slide, the unlatching rocker is restrained by the bolt and so each unlatching lever cannot be operated.

10 Although (in the locks described immediately above) there is provision for operating remote locks, it will be appreciated that they may not, and need not, always be employed with the locks described above as the locks operate quite satisfactorily without remote locks – for this reason it can be said that the remote locks or remote engaging members are operably connectable to the driver and are connectable to the drive slides because they can be connected when so desired.

In some forms of locks, the latch bolt, auxiliary bolt and locking cam are omitted to provide a lock for the fixed (first) door (that which has the strike plate attached) of a pair of French doors, said lock having one or a pair of remote bolts operated by an unlatching lever that is lockable as described above when a cylinder 20 is included in the lock. In other forms of this lock, the lock body is adapted to include a recess for an outwardly biased locking plunger (not shown but similar to the auxiliary bolt) that is positioned adjacent the driver member that when depressed engages in a peripheral recess of the driver annulus to restrain it from being displaced from the fully displaced position corresponding to extended remote bolts.

25 This locking plunger is depressed when the first door is closed wherein the front plate of the lock of the first door slides over the locking plunger to depress it to engage in the peripheral recess – by this means the fixed door is locked by the closing of the first door that preferably employs a lock with a latch bolt as described above.

In some forms of locks, there is means of releaseably restraining the driver member in the fully displaced position and to restrain the driver member in the undisplaced position, said means including **recesses 175** within the side of the drive annulus and a **ball 176 116** biased towards the annulus by **spring 177 117** wherein the spring and ball are located within a substantially radially extended recess 178 117 within the casing that intersects the recess for the driver annulus. When the 30 driver annulus is in either the fully displaced or undisplaced position the ball is aligned with one of the radial recesses.

Some forms of locks include, a lower secondary slide 179 118 that is connected to the lower drive slide to facilitate connection to a lower vertically elongated member that is connected to a lower remote lock. In one form, the lower secondary slides comprises a screw-like threaded fitting 180 that can receive and mate with an internally threaded end of a lower rod or tube. In some forms the lower drive slide extends vertically (within a casing channel 181) along the inside wall of the casing to pass through an aperture 182 in a horizontal wall 183 disposed towards the lower end of the casing whereupon to dog-leg 184 so as to have the end portion halfway between the casing sides and this end portion mates within a central axial recess 185 of a substantially cylindrical end fitting that is threaded externally 186.

Similarly, in some forms of locks, there is included an upper secondary slide 187 118A connected to the upper drive slide to facilitate connection to an upper vertically elongated member that is connected to an upper remote lock, said upper secondary slide in one form comprising a screw-like threaded fitting 188 that can receive and mate with an internally threaded end of an upper rod or tube. In some forms the upper drive slide extends vertically along the inside wall of the casing to pass through an aperture 189 in a horizontal wall 190 disposed towards the upper end of the casing whereupon to dog-leg 191 so as to have an end portion halfway between the casing sides and this end portion mates within a central axial recess 192 of a substantially cylindrical end fitting that is threaded externally. In forms of the invention, the end fittings are within the casing when the driver member is undisplaced.

In some forms, the drive members comprises hollow tubes and the screw-like threaded fittings comprise cylindrical members 193 connected to a disc-like portion 194 of larger diameter that is slotted 195 to receive the orthogonal (dog leg) portion of a drive slide and that has a axial aperture to receive the end portion of a drive slide, the slot restraining the fitting against rotation as the tube is wound onto the outer threaded portion of the cylindrical portion. The cylindrical portion is preferably connected to a cone portion 196 through which the axial aperture extends. In other forms, the fitting comprises a cone portion having an axial aperture connected to a cylindrical member having an axial aperture to receive the end portion of a drive slide and an orthogonal side aperture to supported an outwardly biased pin that is displaceable to project into an aperture in the side of the tube whereby to become partly within both apertures whereby to connect the tube to the fitting.

The axial aperture within the cone is preferably connected at the point 197 to a flexible elongated fitting member (in some forms comprising a cord 198) that can

be inserted into the door along the path that it is intended to fit the tube and to extend from the wing a sufficient distance to enable the tube to be threaded onto the cord. The cord when pulled tight is then used to guide the tube into engagement with the threaded fitting by being slid along the tensioned cord.

5        In locks where the remote locks are connected to the main lock by Bowden Cables and the cables operate in the same direction, the lower inner cable is preferably connected to an **alternative first joint 199** that is on the opposite side of the drive member from the first joint and is substantially co-axial with the first joint and preferably comprises a pin joint. In these forms, the internal fixed portion of the 10 casing are adapted to provide an **open channel 200** (open from the rear of the casing) extending from the driver member towards the lower end of the casing to intersect a **receiving portion 201** to accommodate the **end 202** of the outer cable **203** comprising a **slotted aperture 204** in a casing side wall and a **slotted aperture 205** in a fixed portion to receive **sideways protruding wings 206** of the outer 15 Bowden cable. Similarly, The upper inner cable is preferably connected to the **first joint** and the internal fixed portions of the casing are adapted to provide a **receiving portion 207** to accommodate the **end 208** of the outer cable comprising a **slotted aperture 209** in a casing side wall and a **slotted aperture 210** in a fixed portion to receive sideways protruding wings **211** of the outer Bowden cable.

20        In some forms of the above, the end of the lower Bowden cable comprises an inner **semi-flexible cable 212**, within a **rigid tube 213** of small external diameter that is connected to an outer **semi-flexible sheath 214** of larger diameter and where the inner cable has a **return portion 215** that is within an aperture in the driver member, the rigid tube is within the open channel and the larger sheath has the sideways 25 protruding wings. In some forms, the inner cable comprises a single strand of steel wire and the rigid tube comprises steel tube.

30        In other forms of the invention, each drive arm and the driver locking slide is omitted and the driver annulus is operably connected to the deadlocking slide by a vertically elongated deadlocking slide extension that preferably comprises a rod that extends along the rear of the lock as does the inner Bowden Cable described above and that has a return portion at each end, one of which shares an alternative first pin joint with the annulus and the other shares a pin joint with the deadlocking slide. In this form of locks, the deadlocking slide is preferably configured to displace about 11 MM as is common in security door locks. However, if the axis of the alternative pin 35 joint is a lesser radial distance from the axis of the annulus than the first pin joint and they are co-radial then a displacement by the deadlocking slide causes a larger displacement of the drive slides sharing first and second pin joints. By this means the

drive slides can be displaced 15 MM by operation of the cylinder. It will be appreciated however, that such mechanisms cannot apply forces as large as those that can be applied by an unlatching lever. In these forms of locks, the remote bolts are operated by actuation of the key and/or locking lever as is common in security

5 door locks. The locks are configured such that the undisplaced configuration of the deadlocking slide corresponds to the undisplaced configuration of the driver annulus.

In the context of this specification, a remote lock or remote engaging means or remote engaging member all include a simple plunger like member connected directly to a vertically elongated member that is connected to a drive slide and they 10 all include a more sophisticated device where a remote bolt is actuated by an intermediated mechanism that in some cases includes a remote lock casing and in some cases includes means for separately deadlocking the remote bolt, wherein said independent deadlocking is effected by displacement of the associated drive slide.

The inventions herein include a means of assembling springs into the casing 15 after the sides have been fixed, this method comprising providing apertures within a side of the casing sufficiently large to provide passage for the spring that once installed is retained within the casing by spring force and/or the casing side. The inventions herein include a means of assembling elongated drive members to drive slides of the lock.

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Some of the above described locks are configured such that

- the upper and a lower drive slide each displace over a 15 MM range
- the bolt when fully extended protrudes 16 MM from the casing
- the bolt has a width of 13 MM
- the casing has a external width of 16 MM
- the casing internal width is 13 MM plus working clearance for the bolt
- the backset is 30 MM
- the casing depth is 41 MM
- levers that rotate less than 40 degrees to unlatch
- the distance between cylinder and lever axii of 85 MM
- the bolt is in the middle of the front plate
- the front plates are interchangeable
- the backset can be changed by the addition of spacers
- the casing length does not greatly exceed 155 MM

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The inventions described herein are suitable for a displaceable wing 216 122 as shown in Fig 26, supported adjacent an opening 217 123. The wing has a closing edge 218 124 that is adjacent an element 219 125 that defines the opening when the wing is closed. In the case of hinged doors, the free edge of the door 220 5 is adjacent the door jamb 221 126 when the door is closed and it is on this free edge that the lock body 222 127 is mounted. The lock body 223 includes a casing having a front edge 224 (that in the forms described above comprises a front plate) and a displaceable bolt, said bolt being displaceable to a position where it protrudes from the casing relative to the front edge to engage the strike plate - the front edge 10 including a bolt aperture to provides passage for the bolt.

Forms of the inventions include an improved strike plate 225 128 that comprises a substantially conventional strike plate having a wing 226 129 to facilitate latching, an aperture 227 130 to provide passage for the bolt and upper and lower portions that are attachable (usually by screws) to the element defining the opening.

15 The aperture of the improved strike plate includes a front edge 228 131 against which the bolt is urged when the door is urged in an opening direction as occurs when one attempts to force open a locked door. The substantially conventional strike plate in preferred forms, is modified to resist jemmying by enabling the portion of the strike plate adjacent the front edge to be displaced with 20 the bolt while the portions attached to the opening remain attached to the opening while being subjected to forces that tend to pull the strike plate away from the opening and that urge the fixing screws to pull out, however the further modified strike plate subjects the screws to considerably lower forces than are applied by a conventional strike plate. The aperture of this strike plate are within a substantially 25 flat plate-like portion 229 132 extending from between a lower slot 230 133 to an upper slot 231 134 and connected to the strike plate wing 232 133 that preferably comprises an angled or curved wing and each said slot extends from the rear edge 233 135 to pass between the screw aperture and aperture and preferably each slot further extends to include a vertical portion 234 136 between the screw aperture 30 and wing. Importantly, the front edge of the aperture is within a portion of the strike plate that is connected to the wing so as to be displaced with the wing.

35 The strike plate wing is connected by bridges 235 137 of reduced cross-sectional area and the strike plate is of a deformable material enabling these bridges to deform without cracking and the reduced areas enables deformation to occur at reduced forces – these characteristics enabling the wing to be angularly displaced about a deformation axis 236 138 that passes substantially through each bridge. If forms where the front edge is rearwardly disposed relative to this deformation axis,

rotation of the wing causes the front edge to be displaced towards the wing and bolt to bring the bolt into closer engagement with the strike plate. When a jemmy blade rests on the strike plate wing as it is rotated to part the wing from the opening, the blade angularly displaces to deform the bridges and to cause the wing to rotate about 5 the deformation axis.

The upper and lower extremes 237 139 of the plate-like portion (that portion between the apertures and the slots) are of reduced cross-sectional area to enable these portions to deform under low forces so as to deform as the blade portion 10 angularly displaces about the deformation axis. When these portions are caused to engage the face of the lock they deform so as not to inhibit the displacement of the wing about the deformation axis.

The bridges connect to fixable portions 238 140 that include screw apertures 239 141 through which screws shanks have passage and by which the fixable portion is attached to the opening. In some types of deformation the fixable 15 portions angularly displace about the screw to reduce the effective distance between bridges, and this feature combined with the fact that the wing is attached only at each to a bridge enables the wing and front edge to deform like a bow and at comparatively moderately low forces to thereby enable the front edge to displace with the bolt while the fixable portions remain attached to the opening while being 20 subjected to reduced loads that urge the screws to pull out of the opening.

In common forms of jemmy attack, when a closed and locked door is urged open under the action of a jemmy blade placed adjacent the bolt, the bolt is forced against the front edge while the lock is simultaneously displaced away from the strike plate and as a result, the bolt (in part, as a result of friction between the bolt and front 25 edge) causes the strike plate to deform to enable the front edge to displace with it. Complete locks (complying with common functionality requirements) and comprising a combination of the integers described above

**Passage Lock, F75** latch bolt operated by lever from either side at all times.

The lock has an outwardly biased latch bolt (comprising a chamfered bolt or a 30 prism bolt (with or without hooks) and auxiliary bolt), an unlatching cam or a pair of such, an unlatching rocker, interior and exterior levers connected to a single shaft, it does not have a cylinder or a locking member and the deadlocking slide and locking cam can be omitted from the lock

**Privacy, F76 G2 and 3** a latch bolt operated by lever from either side except when 35 levers are locked by locking lever (snib) on inside.

The lock has an outwardly biased latch bolt (comprising a chamfered bolt or a prism bolt (with or without hooks) and auxiliary bolt), an unlatching rocker and a single shaft, an interior locking member and a deadlocking slide, a lockable exterior lever (having a stop slide) and an interior lever each connected by separate shafts to 5 separate unlatching cams.

In this lock, the exterior handle set is adapted to include an exterior locking lever comprising hand operable coin slot that is connected to the locking cam by an additional spindle

**Patio, F77 G2 and 3** deadlocking latch bolt operated by lever from either side 10 except when outside lever is locked by snib locking lever on inside. Automatic unlocking when inside lever is rotated or unlocked by locking lever.

The lock has an outwardly biased latch bolt (comprising a chamfered bolt or a prism bolt (with or without hooks) and auxiliary bolt), unlatching rocker, a locking member, a locking cam and an adapted deadlocking slide having a deadlocking 15 shoulder and a ramped unlatching portion, a lockable exterior lever and an interior lever each connected by separate shafts to separate unlatching cams.

**Entrance, F 81** deadlocking latch bolt operated by lever from either side 20 except when outside lever is locked by locking lever on inside. When outside lever is locked, latch bolt is retracted by employing exterior key to displace the deadlocking slide to the undisplaced position to enable the exterior lever to be operated or rotating interior lever. Locking lever must be operated to unlock exterior lever.

The lock has an outwardly biased latch bolt (comprising a chamfered bolt or a prism bolt (with or without hooks) and auxiliary bolt), unlatching rocker, a locking member, a cylinder with a key operable barrel and an adapted deadlocking slide 25 having a deadlocking shoulder and ramped unlatching portion, a lockable exterior lever and an interior lever each connected by separate shafts to a separate unlatching cam and no locking cam and the spindle passes through an aperture in the casing to mesh in lever locking cam 76 of the exterior handle assembly. The casing in this function is modified by the inclusion of a casing shoulder to prevent the cylinder from displacing the deadlocking slide from the third locked configuration to 30 the first locked configuration.

**Entrance, F82 G 1** deadlocking latch bolt operated by lever from either side 35 except when outside lever is locked by locking lever on inside. When outside lever is locked, the exterior lever may be operated after unlocking by key or by rotating interior lever which unlocks the exterior lever.

The lock has an outwardly biased latch bolt (comprising a chamfered bolt or a prism bolt (with or without hooks) and auxiliary bolt), unlatching rocker, a locking

member, a cylinder with an exterior key operable barrel and an adapted deadlocking slide having a deadlocking shoulder and ramped unlatching portion, a lockable exterior lever and an interior lever each connected by separate shafts to a separate unlatching cam and a locking cam and the spindle passes through the locking cam to mesh with it and then mesh in the lever locking cam 76 of the exterior handle assembly. The casing in this function is modified by the inclusion of a casing shoulder to prevent the cylinder from displacing the deadlocking slide from the third locked configuration to the first locked configuration.

10 Classroom, F84 deadlocking latch bolt operated by lever from either side except when outside lever is locked by key from exterior. When outside lever is locked, latch bolt retracted by rotating interior lever or by unlocking exterior lever by key and then operating exterior lever.

The lock has an outwardly biased latch bolt (comprising a chamfered bolt or a prism bolt (with or without hooks) and auxiliary bolt), unlatching rocker, a cylinder with an exterior key operable barrel and an adapted deadlocking slide having a deadlocking shoulder and ramped unlatching portion, a lockable exterior lever and an interior lever each connected by separate shafts to a separate unlatching cam and a the spindle that passes through an aperture in the casing to mesh in the lever locking cam 76 of the exterior handle assembly. The casing in this function is modified by the inclusion of a casing shoulder to prevent the cylinder from displacing the deadlocking slide from the third locked configuration to the first locked configuration.

**F91** deadlocking latch bolt operated by lever from either side except when both levers are locked by key from either side.

25 The lock has an outwardly biased latch bolt (comprising a chamfered bolt or a prism bolt (with or without hooks) and auxiliary bolt), an unlatching rocker, a cylinder with interior and exterior key operable barrels, deadlocking slide, an exterior lever and an interior lever each connected to an unlatching cam by a single shaft. The improved lock, subject of this specification also has provision for interior locking by lever wherein the lock may electively include a locking cam, locking member and a  
30 spindle that interconnects each to the other.

**Nightlatches having automatic deadlocking when the wing is closed.**

The deadlatching latch bolt is operated by lever from either side when lock is unlocked. The lock has an outwardly biased deadlocking latch bolt (comprising a chamfered bolt or a prism bolt (with or without hooks) and an alternative auxiliary bolt, an unlatching rocker, a locking member, a cylinder with an exterior key operable barrel and an alternative spring biased deadlocking slide, an exterior lever and an interior lever each connected by a single shaft to an unlatching cam. The casing in

this function is modified by the inclusion of a casing shoulder to prevent the cylinder from displacing the alternative deadlocking slide to the first locked configuration. The lock is unlocked by key from either side to enable either lever to retract the bolt. The lock may also include a locking member and locking cam by which to unlock the lock.

5        The cylinders within the locks described above, (except for F91 which absolutely requires such) electively additionally include an interior key operable barrel OR an hand operable turn knob

*The improved locks described above, all have provision to operate remote locks.*

10       **Multipoint Locks** with provision to connect to upper and lower remote locks by vertically displaceable counteracting drive members that displace simultaneously in the opposite direction.

These locks include a driver member within the casing located adjacent each unlatching cam to be displaceable by each unlatching cam to displace an upper

15       and/or lower driver slide to which drive members can be connected (to operate remote engaging members). The locks further include a latch bolt, unlatching rocker, deadlocking slide, locking cam and locking member, a double free-rotation-cylinder, and interior and exterior levers connected by a single shaft to the unlatching cams (or single cam), said levers being rotated upwards to latch (in some cases to outwardly  
20       displace remote engaging members) remote locks and downwards to unlatch the lock while simultaneously unlatching the remote locks. The locks preferably include a driver locking slide so that in the first locked configuration, the driver is restrained against rotation. The locks alternatively have levers connected by separate shafts to separate unlatching cams and the exterior lever is lockable and the deadlocking slide  
25       comprises an adapted deadlocking slide.

In other forms of these locks, there is a driver member within the lock casing located adjacent each unlatching cam to be displaceable by each unlatching cam to displace an upper and/or lower driver slide to which drive members can be connected to operate remote engaging members. The locks further include a latch bolt, unlatching rocker, deadlocking slide, a double free rotation cylinder, and interior and exterior levers connected by a single shaft to the unlatching cams, said levers being rotated downwards to unlatch the lock while simultaneously unlocking remote locks. In these forms, the driver is connected to the deadlocking slide by a deadlocking slide extension to be displaceable by cylinder.

35       In other forms of these locks, there is provision to connect to upper and lower remote locks by vertically displaceable drive members comprising Bowden Cables that displace simultaneously in the same direction.



**The Claims defining the Invention Are:**

**Driver to operate remote bolts**

'1 A lock including a casing, a bolt supported in the casing to be displaceable

5 between a fully extended position where the bolt protrudes from the casing and a retracted position in which it is substantially within the casing,

an angularly displaceable driver operably connectable to an upper remote engaging member by an upper vertically elongated drive member and/or connectable to a lower remote engaging member by a lower vertically elongated drive member,

10 at least one hand operable angularly displaceable lever having a free end and at least one angularly displaceable unlatching cam to operably connect the bolt and driver to the at least one lever,

wherein the bolt is displaceable towards the casing by downward displacement of the free end and each connected drive member is displaceable

15 towards and away from the casing by displacement of the free end.

'2 A lock according to Claim 1, wherein the pivotal axis of the diver intersects through the unlatching cam.

20 '3 A lock according to Claim 1, wherein the diver comprises a substantially annular member supported within a substantially circular recess.

**Exterior handle locking – and adapted locking slide**

'20 A lock including a casing, a bolt supported in the casing to be displaceable

25 between a fully extended position where the bolt protrudes from the casing and a retracted position in which it is substantially within the casing,

operating means by which to displace the bolt towards the retracted position including an exterior and an interior hand operable lever operably connected to the bolt by angularly displaceable means,

30 an adapted locking slide and a hand operable locking member that is operable to displace the said adapted locking slide, said adapted locking slide being displaceable by the locking member to a third locked configuration corresponding to the exterior lever being locked to be restrained against displacement,

said adapted locking slide being displaceable from the third locked

35 configuration to unlock the exterior lever by displacement of the interior lever.

'21 A lock according to Claim 20 wherein the angularly displaceable means comprises an angularly displaceable unlatching rocker.

**Exterior handle locking – and adapted dead locking slide**

5 '25 A lock including a casing, a bolt supported in the casing to be displaceable between a fully extended position where the bolt protrudes from the casing and a retracted position in which it is substantially within the casing,  
 operating means by which to displace the bolt towards the retracted position including an exterior and an interior hand operable lever operably connected to the  
 10 bolt by angularly displaceable means,  
 an adapted dead locking slide and a hand operable locking member that is operable to displace the said adapted locking slide, said adapted dead locking slide being displaceable by the locking member to a third locked configuration corresponding to the exterior lever being locked to be restrained against  
 15 displacement,  
 said adapted dead locking slide being displaceable from the third locked configuration to unlock the exterior lever by displacement of the interior lever.

'26 A lock according to Claim 25 wherein the angularly displaceable means  
 20 comprises an angularly displaceable unlatching rocker.

**Cylinder displaces driver**

'30 A lock including a casing with sides, a bolt supported in the casing to be displaceable between a fully extended position where the bolt protrudes from the  
 25 casing and a retracted position in which it is substantially within the casing,  
 an angularly displaceable driver operably connectable to an upper remote engaging member by an upper vertically elongated drive member and/or connectable to a lower remote engaging member by a lower vertically elongated drive member,  
 deadlocking means by which to restrain the bolt in the fully extended position  
 30 including a key operable cylinder and a deadlocking slide that is connected by a deadlocking slide extension to the driver,  
 said deadlocking slide being displaceable by the cylinder to displace the driver whereby to displace each connected drive member towards and away from the casing.

**Automatically locking lock**

'40 A lock including a bolt comprising a latch bolt having an alternative associated auxiliary bolt supported in the casing, said bolt being displaceable between a fully extended position where the bolt protrudes from the casing and a retracted position

5 in which it is substantially within the casing,

operating means by which to displace the latch bolt towards the retracted position including an angularly displaceable unlatching rocker operably associated with an exterior and interior hand operable lever,

deadlocking means to restrain the latch bolt in the fully extended position  
 10 including an alternative locking slide (without an unlatching ramped portion) biased towards the bolt and a cylinder including a key operable barrel that is operably connected to the alternative locking slide,

15 said alternative locking slide having a horizontally elongated ramped shoulder projecting towards the alternative auxiliary bolt with a horizontal engageable face, said alternative auxiliary bolt also includes a horizontally elongated ramped shoulder projecting towards to deadlocking slide with a horizontal engageable face projecting towards to deadlocking slide,

20 said alternative auxiliary bolt rearward end being biased and displaceable towards the alternative locking slide; the arrangement being configured such that in a pre-latching configuration, the engageable face of the alternative locking slide is above the engageable face of the alternative auxiliary bolt and the alternative locking slide abuts the bolt to be restrained by the bolt; in the third locked configuration the alternative locking slide lies behind the bolt to deadlock the bolt such that it cannot be retracted by lever operation and the alternative auxiliary bolt is substantially  
 25 depressed, at which time

30 the cylinder can be operated to displace the alternative locking slide to the undisplaced position during which displacement the ramped engageable horizontal face of the slide passes over the ramped engageable horizontal face of the auxiliary bolt by displacing the auxiliary bolt sideways against spring bias, said auxiliary bolt subsequently ramped engageable horizontal face being displaced towards the alternative locking slide to engage the said slide,

35 subsequent displacement of the auxiliary bolt as the auxiliary bolt displaces to the fully extended position causes the ramped engageable horizontal face of the bolt to displace from above the ramped engageable horizontal face of the alternative locking slide to thereby release the slide to assume the position corresponding to the pre-latching configuration.

**Fixed door lock**

'60 A lock including a casing having a front plate, an angularly displaceable driver operably connectable to an upper remote engaging member by an upper vertically elongated drive member and/or connectable to a lower remote engaging member by

5 a lower vertically elongated drive member,

at least one hand operable angularly displaceable lever having a free end and at least one angularly displaceable unlatching cam to operably connect the driver to the at least one lever, each connected drive member being displaceable towards and away from the casing by displacement of the free end.

10 said lock further including a locking plunger that protrudes from the front to be displaceable to engage in a recess in the driver whereby to restrain the driver against displacement.

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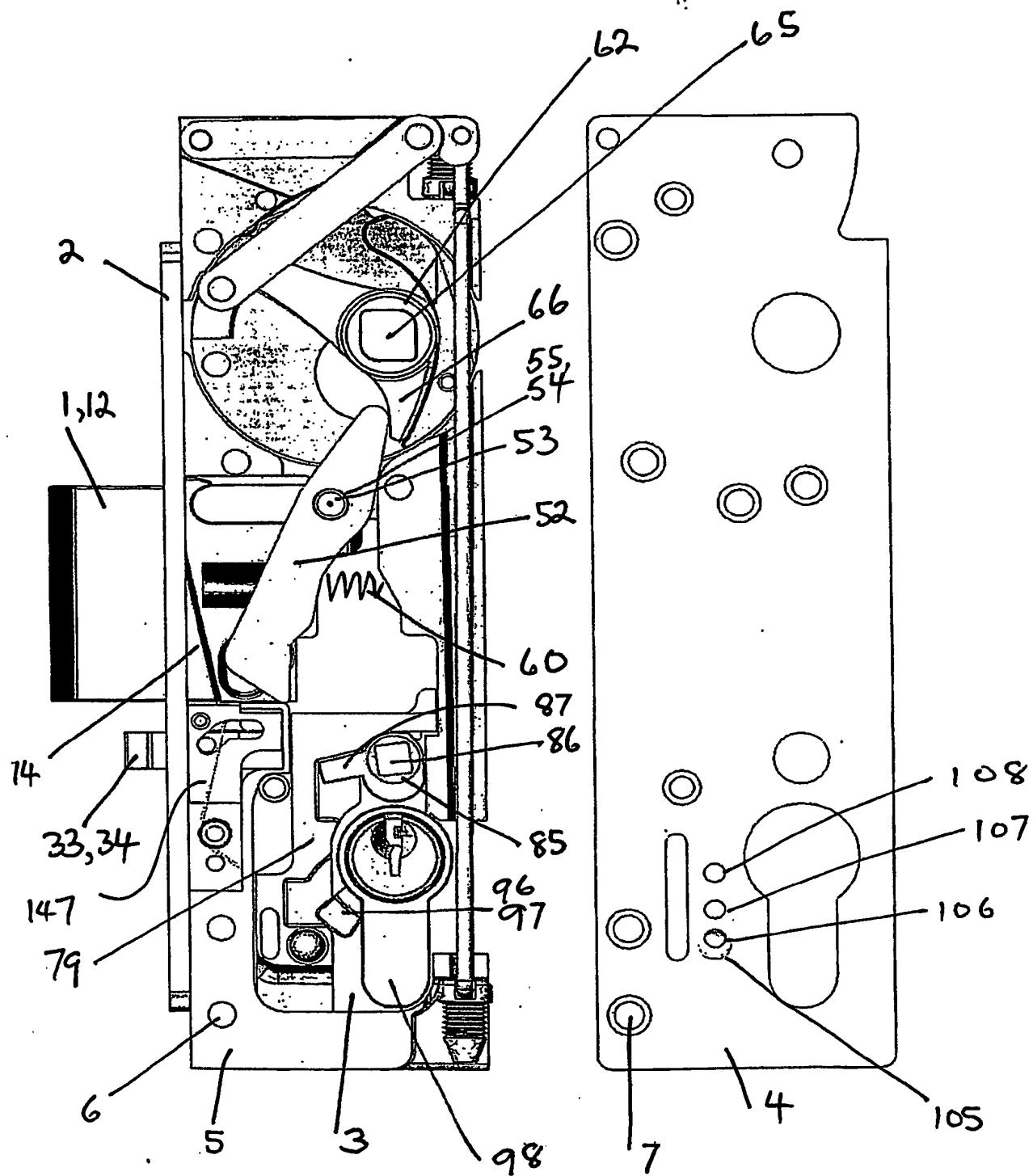


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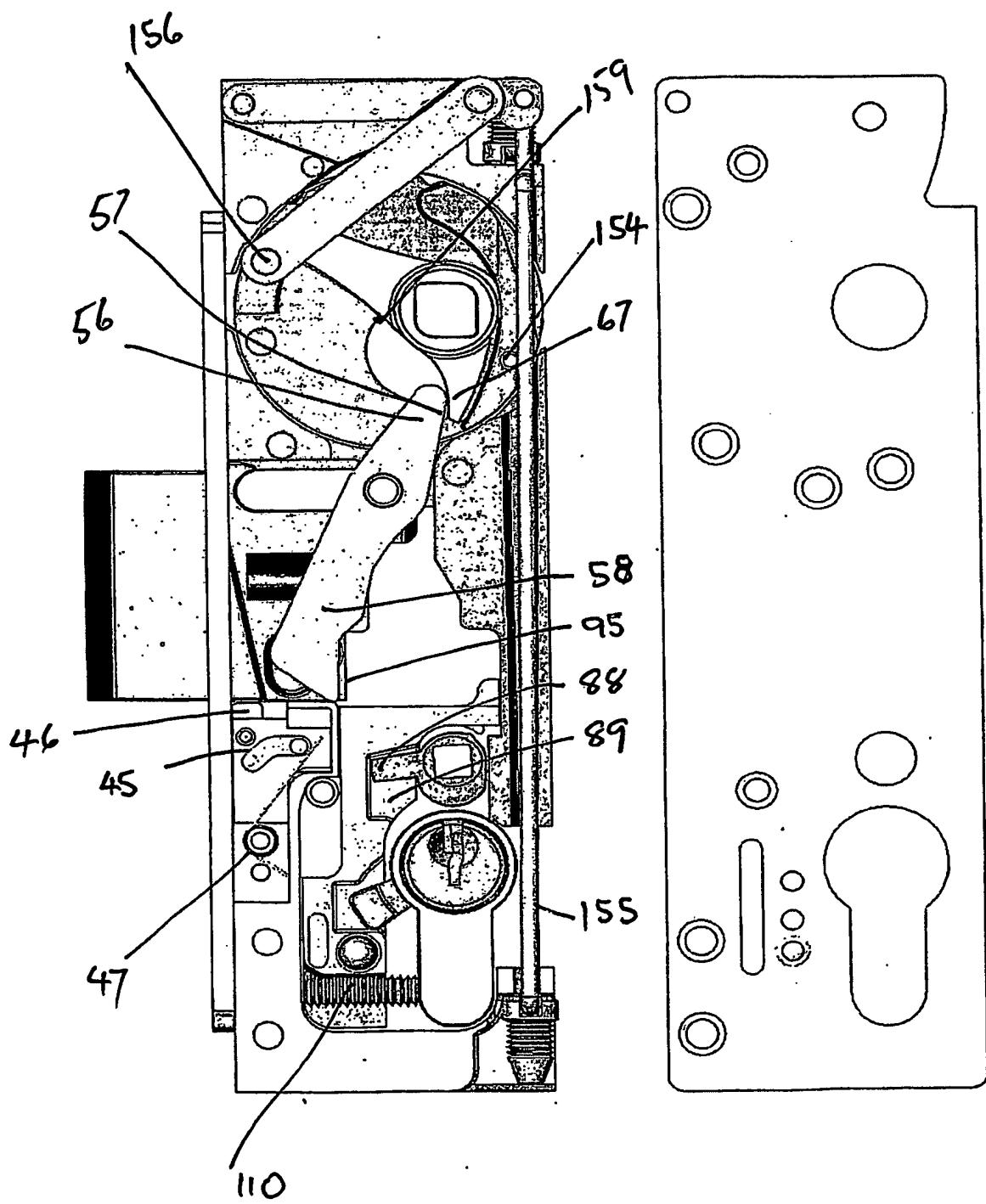


Fig 2

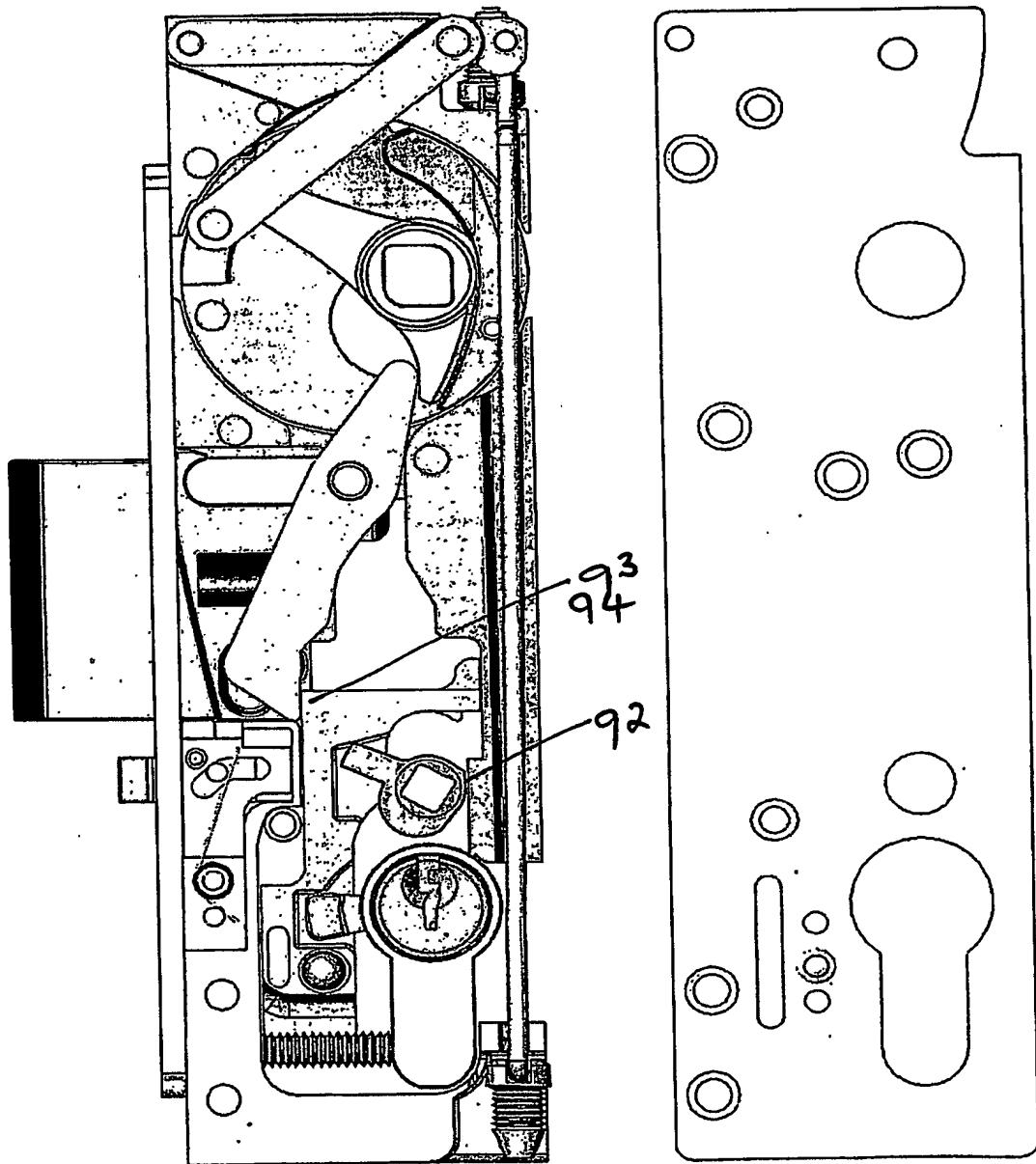


Fig 3

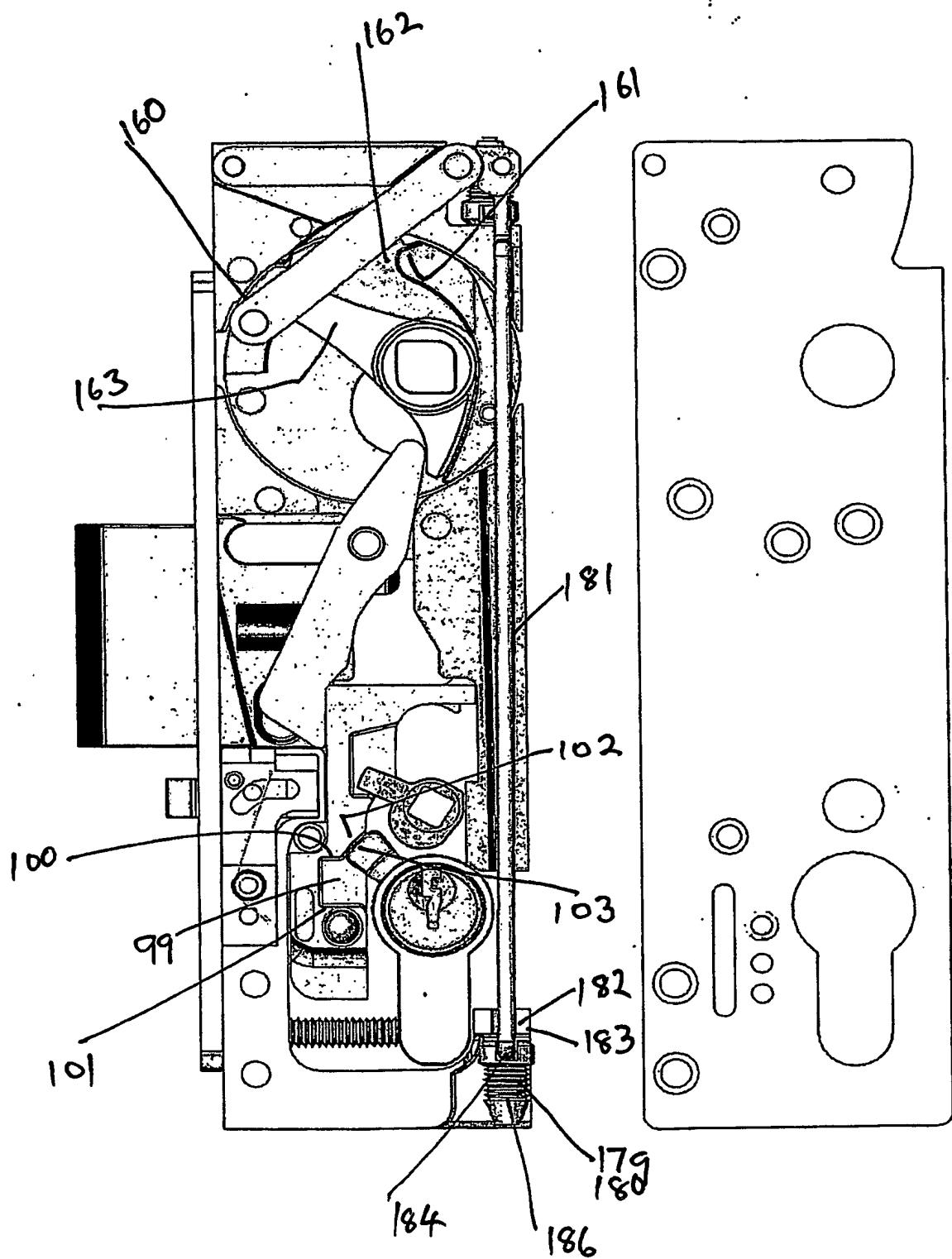


Fig 4

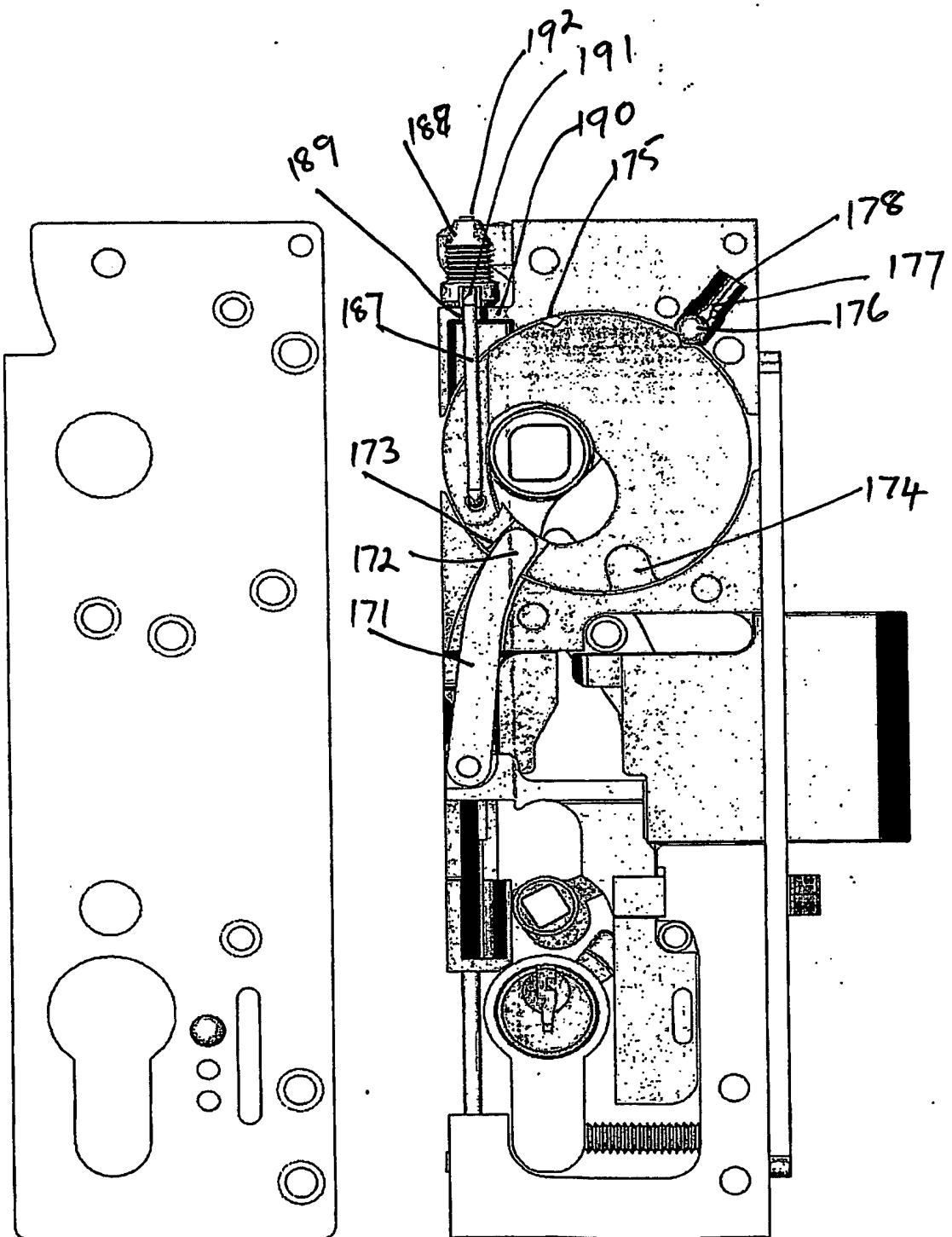


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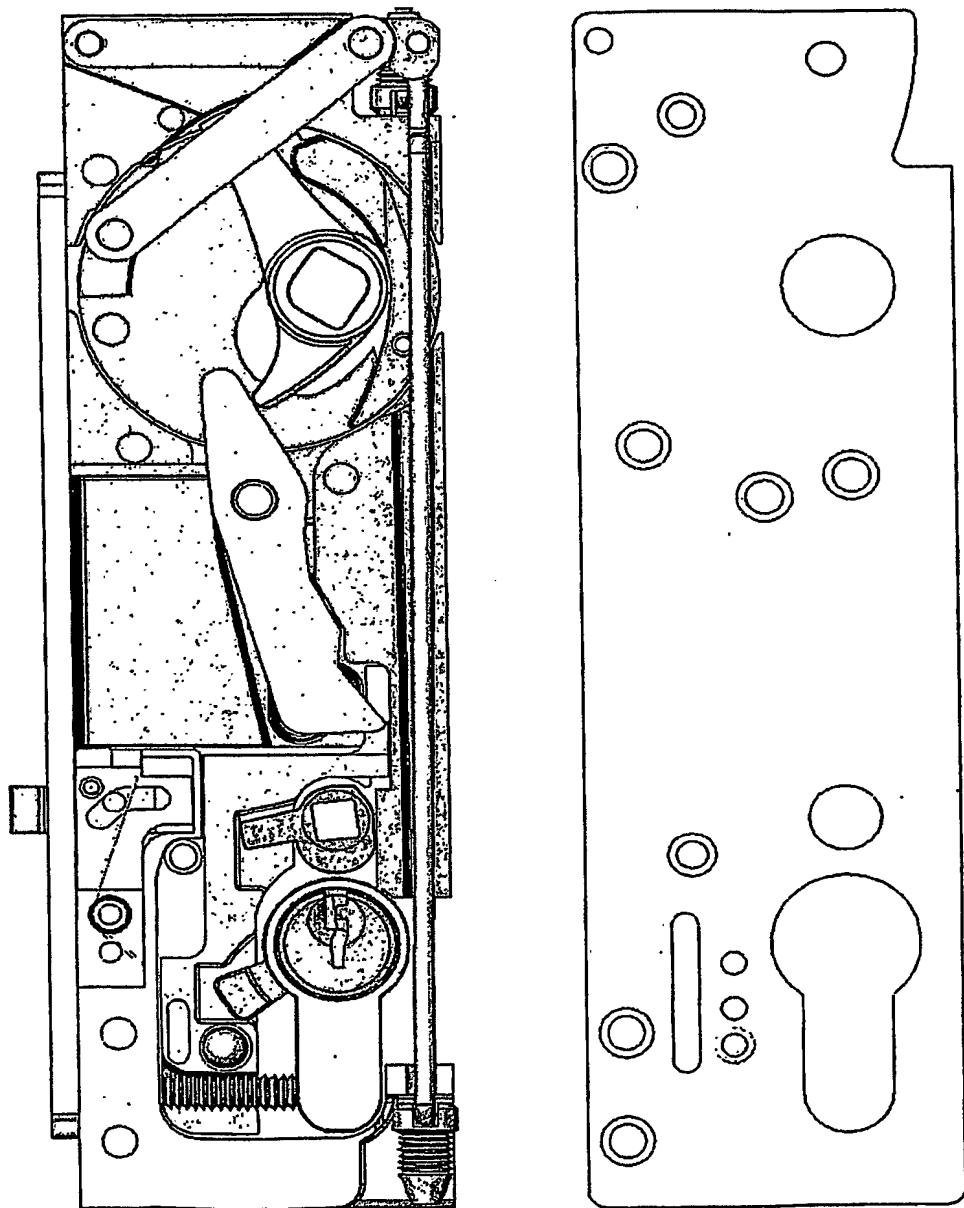


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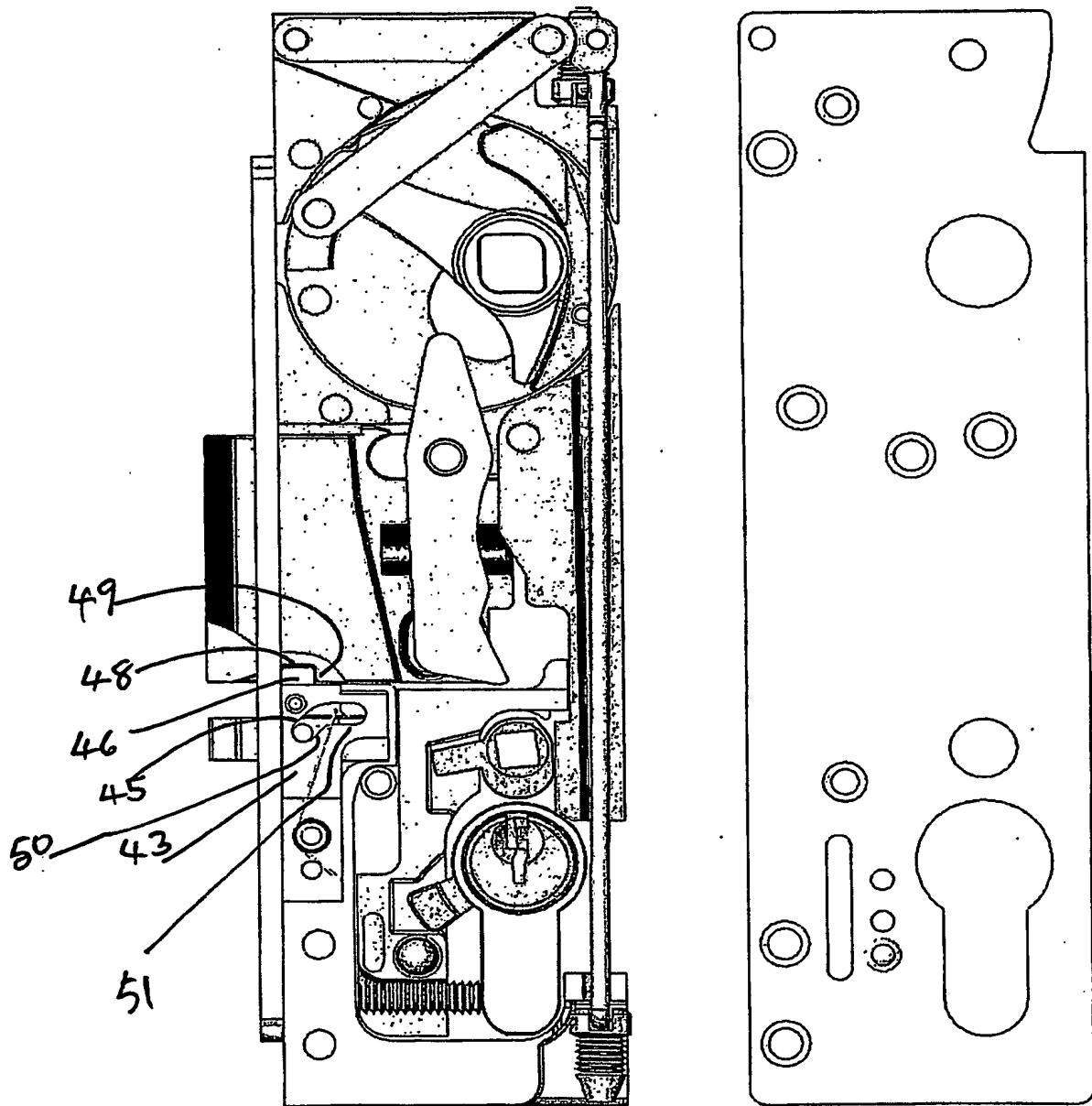


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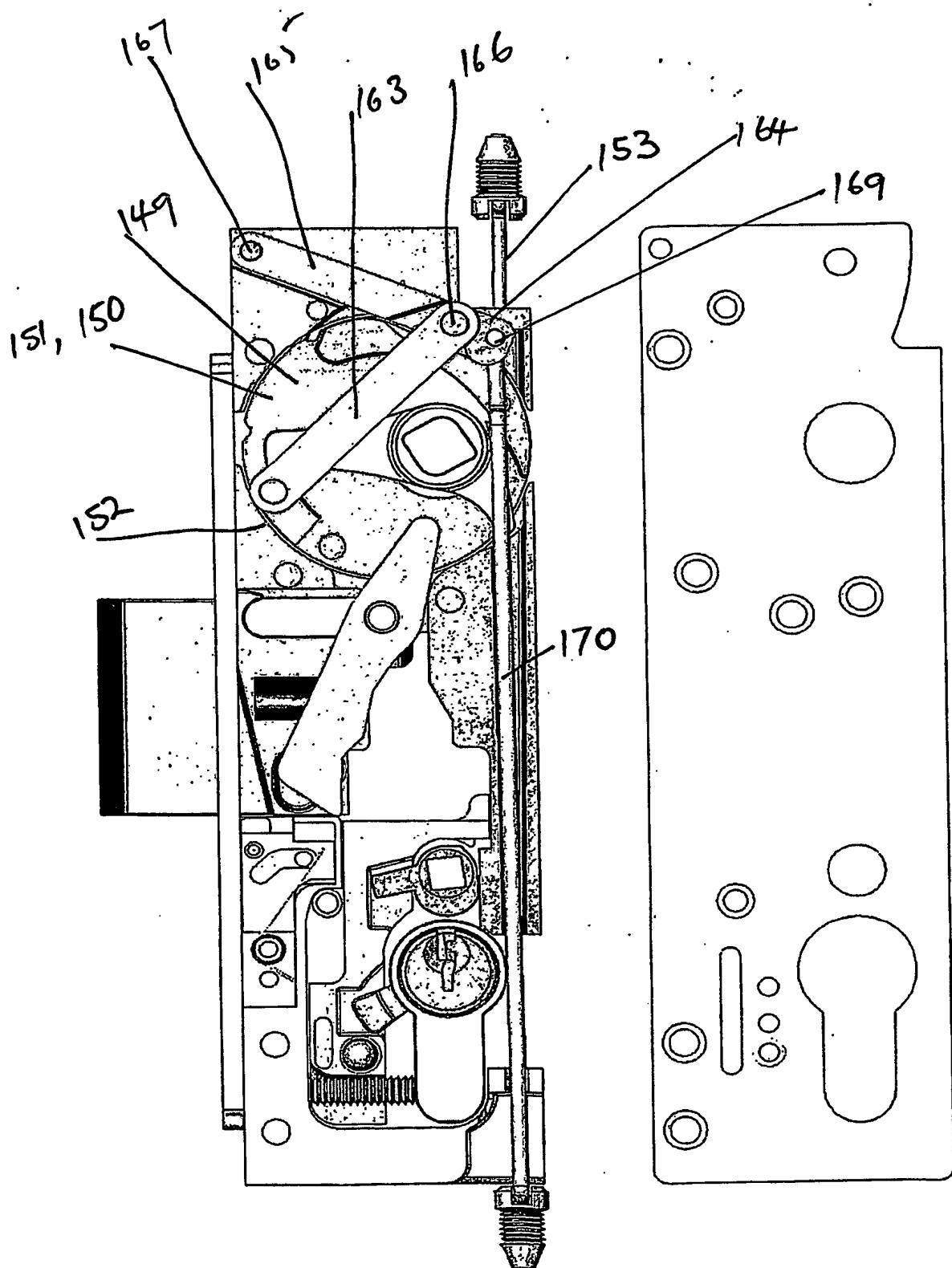


Fig 8

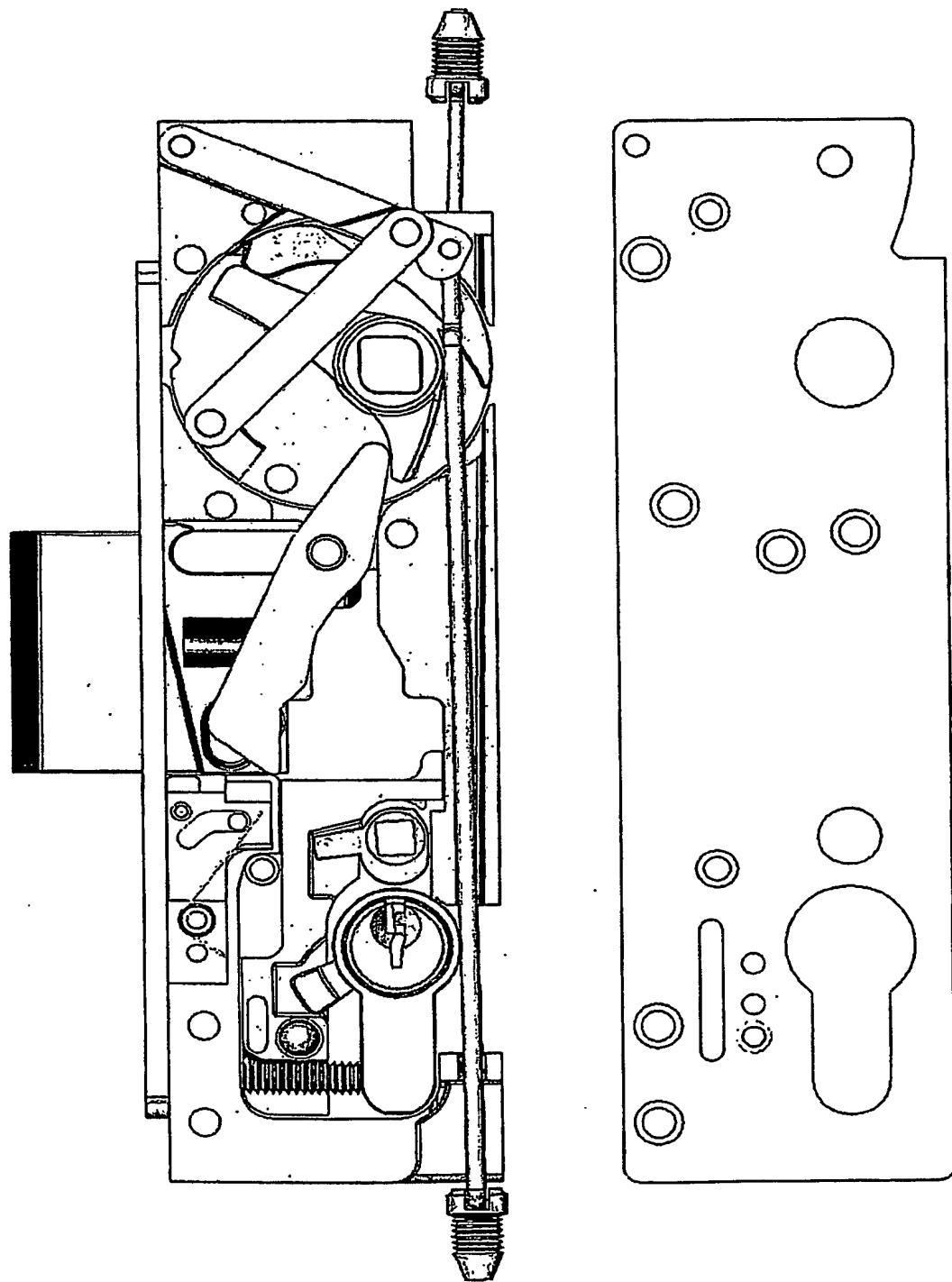


Fig 9

PL 9.

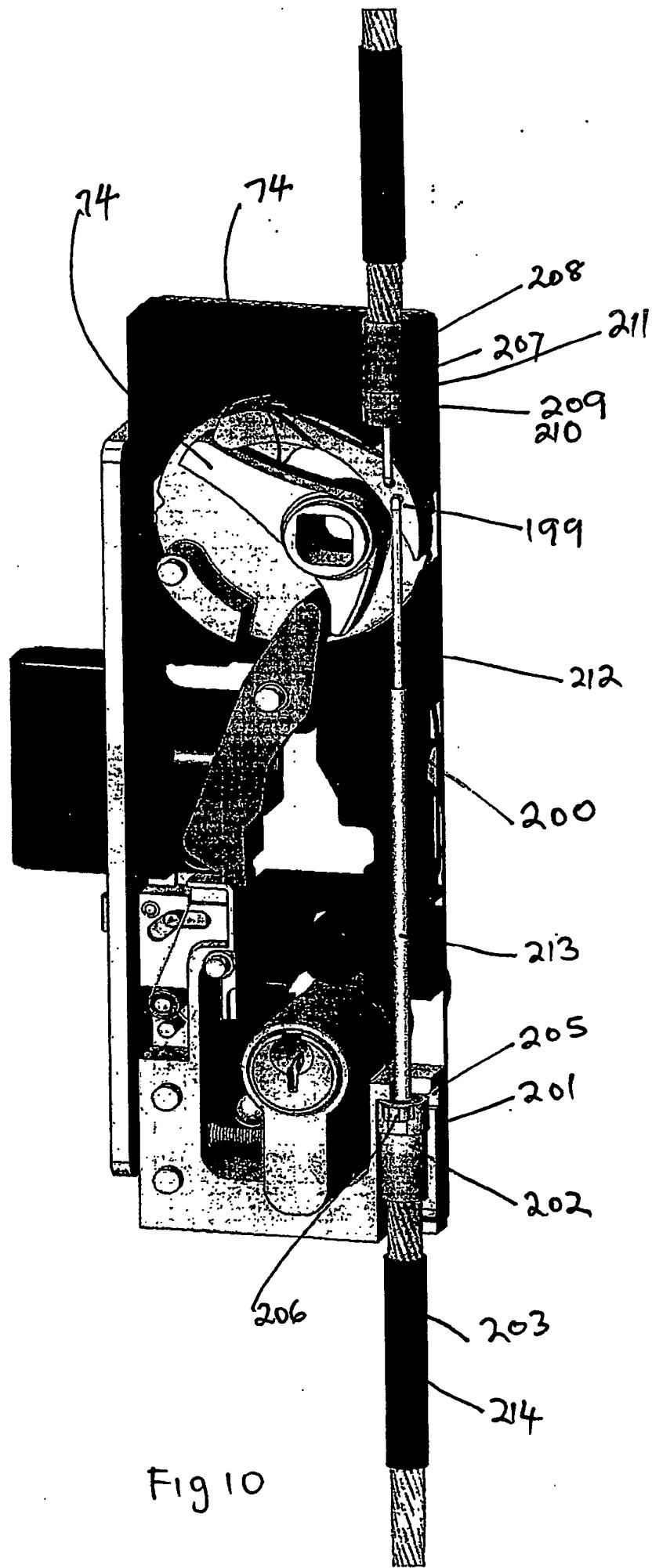
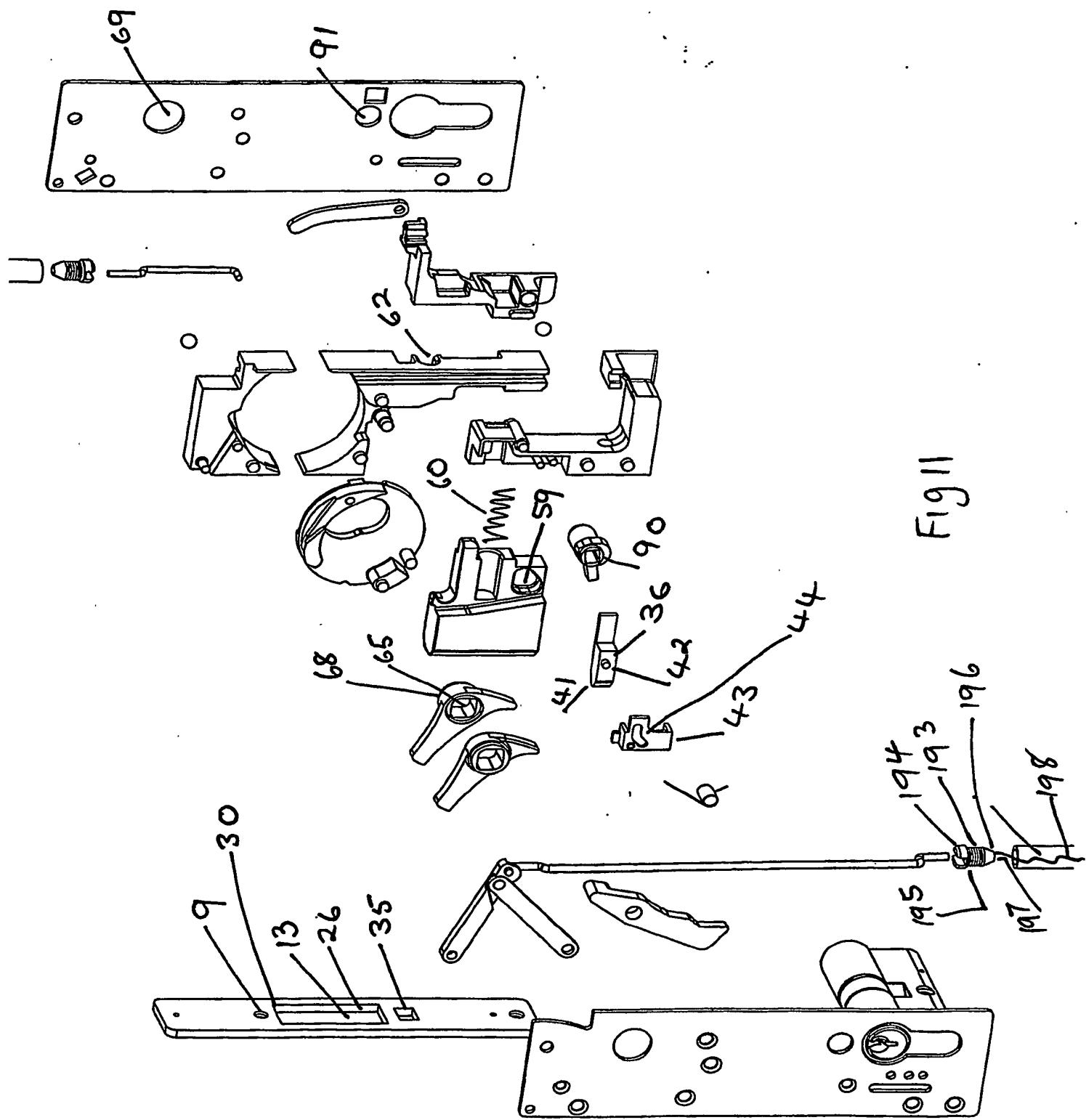


Fig 10

F1510



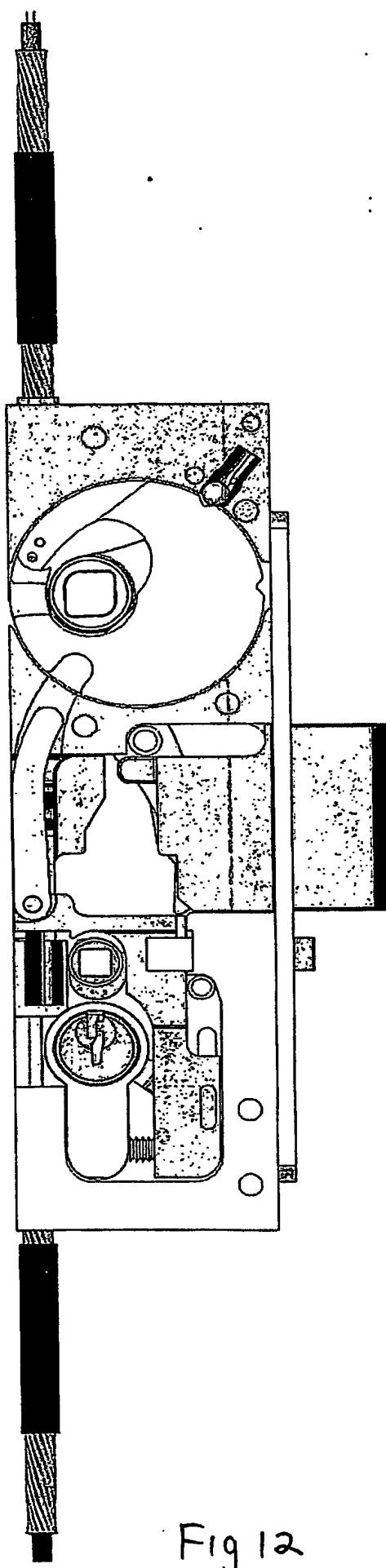


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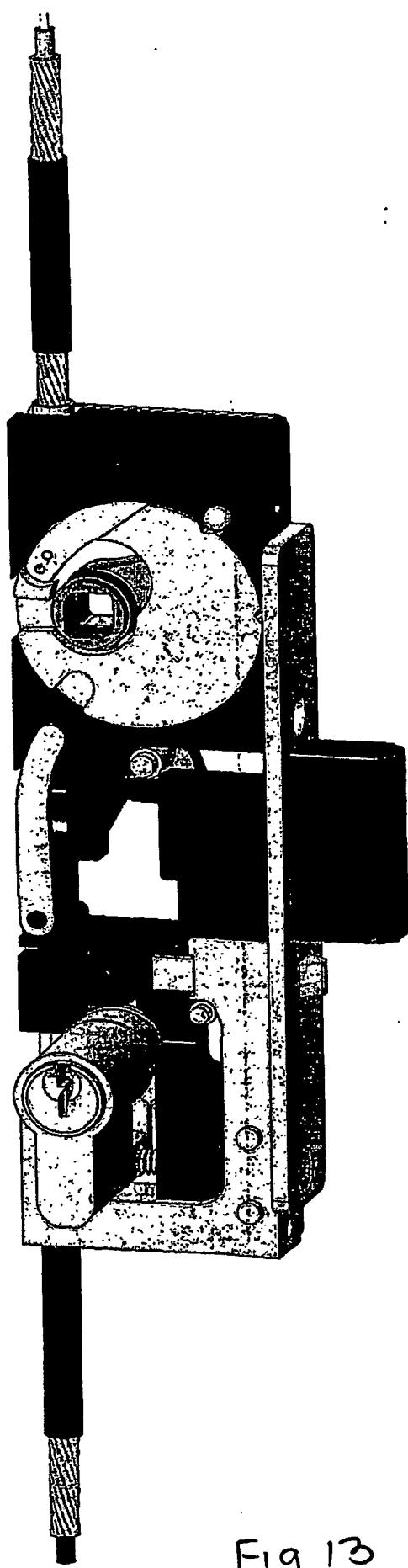


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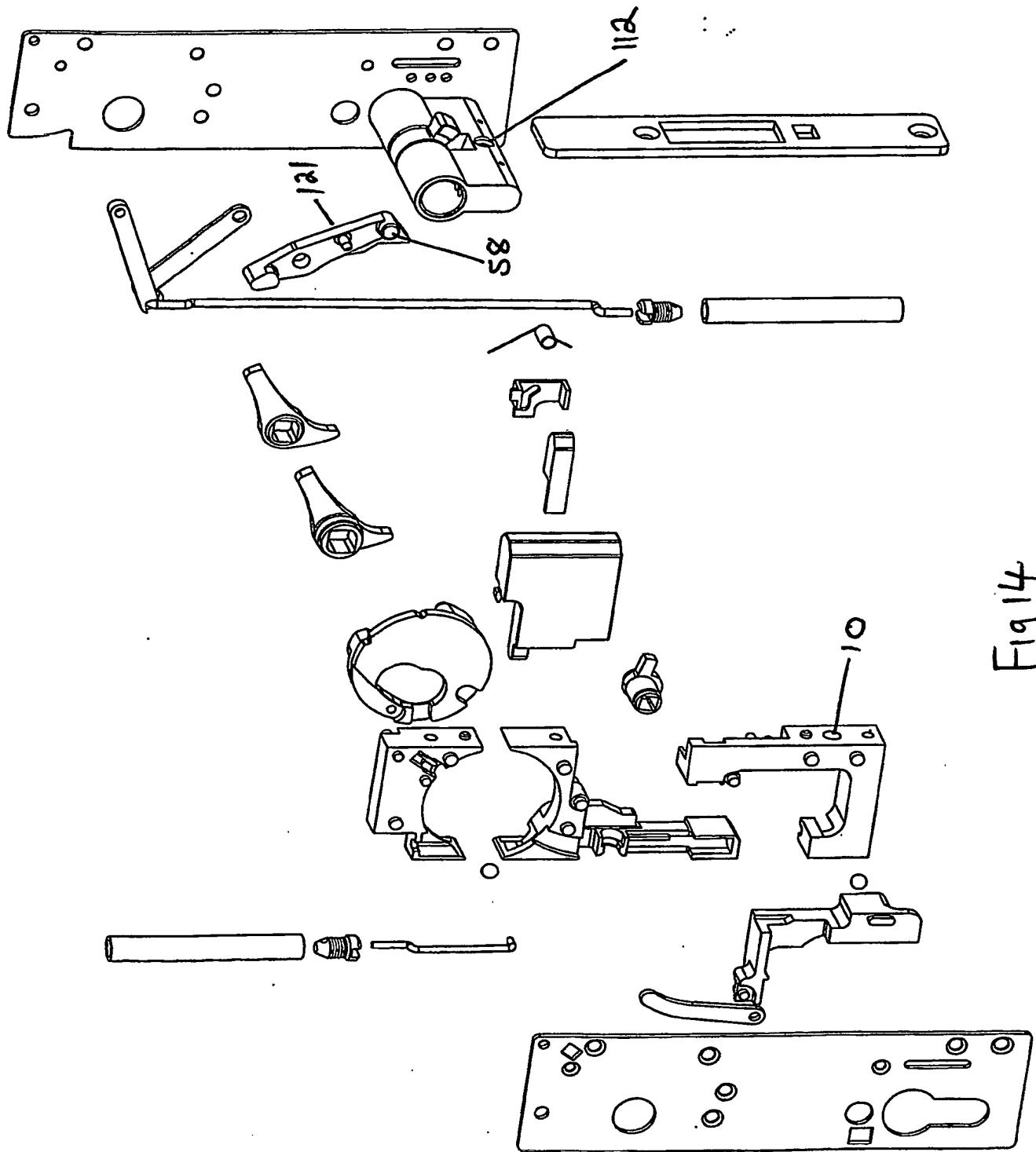


Fig 14

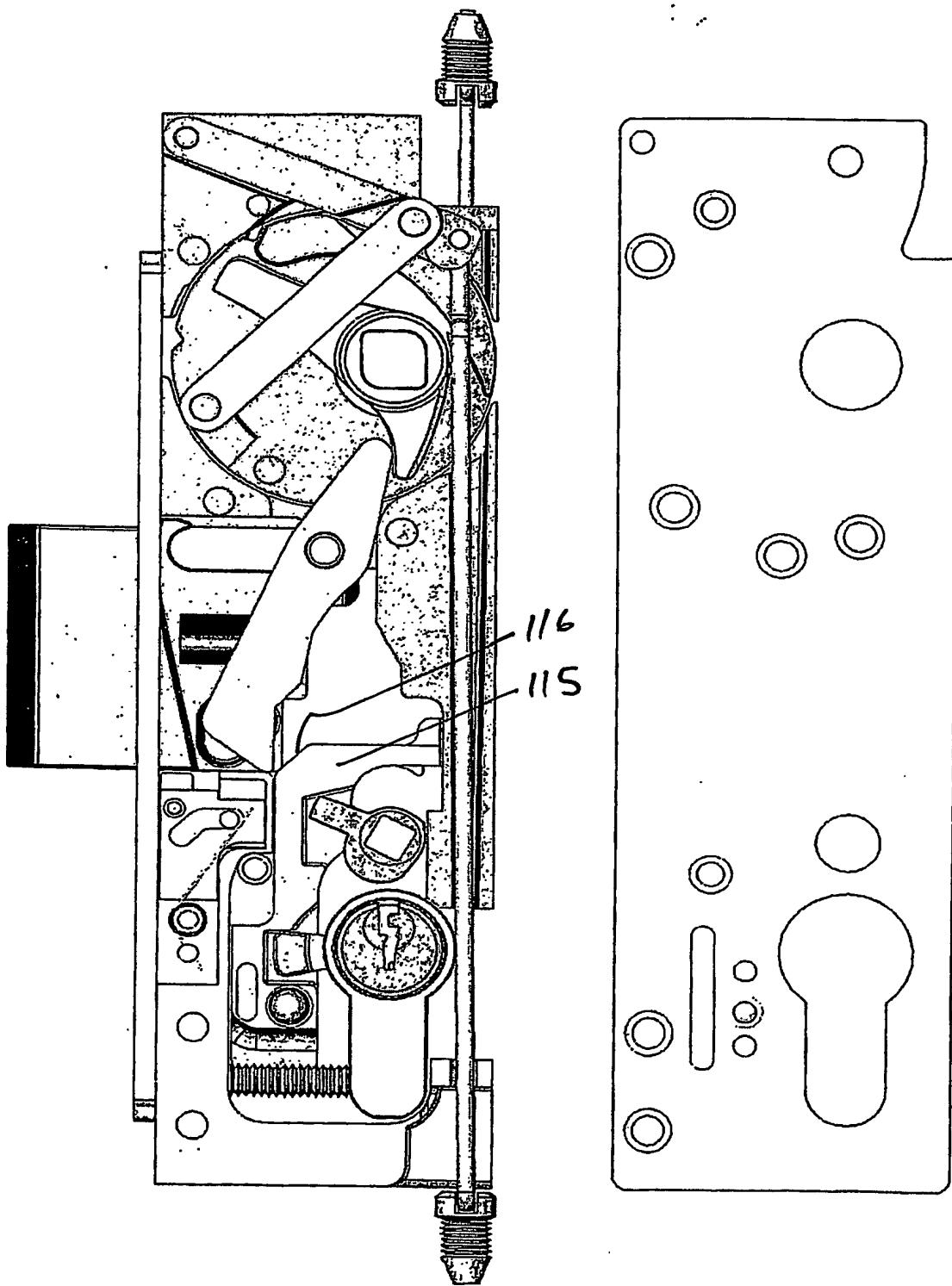


Fig 15

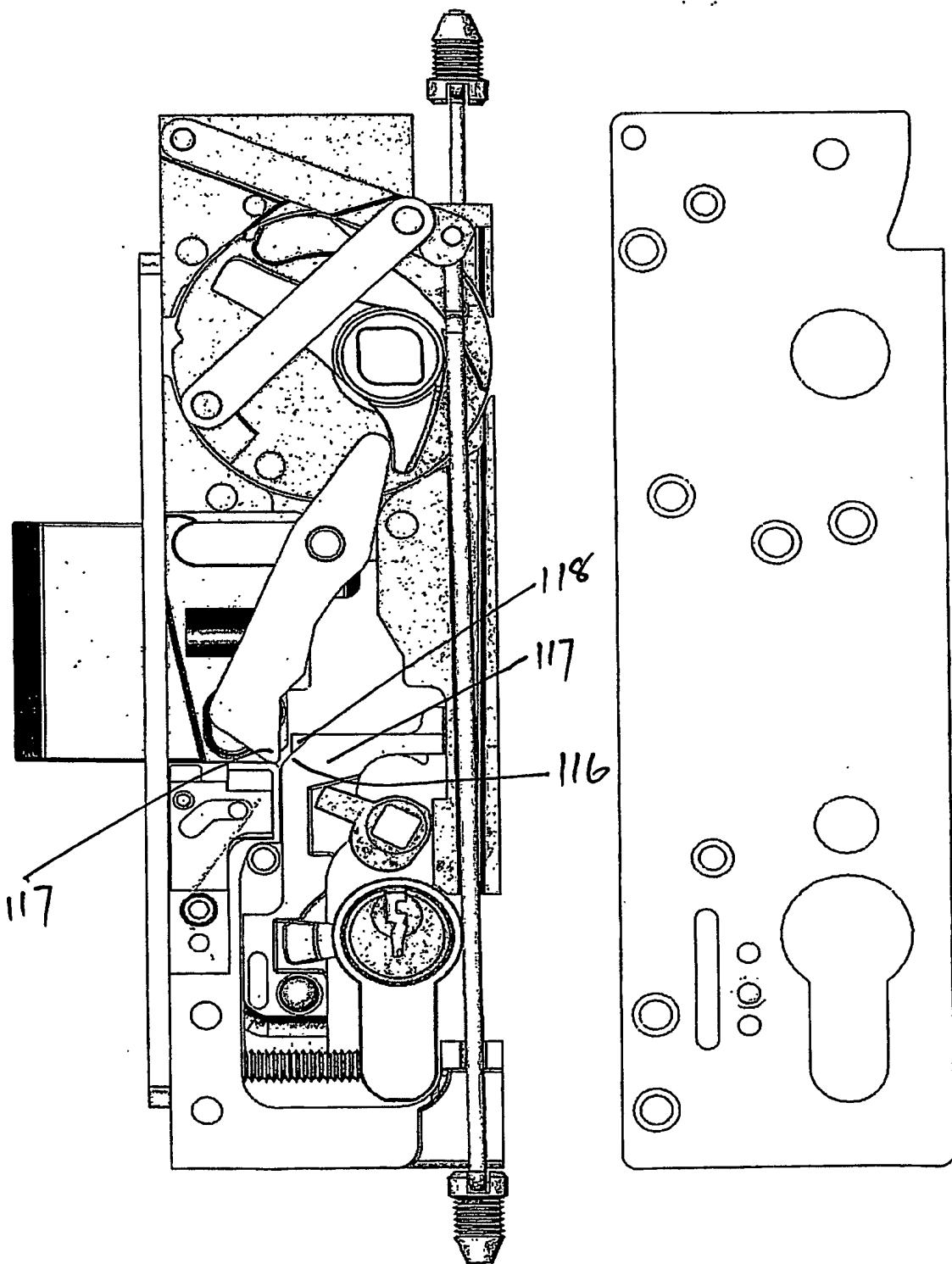


Fig 16

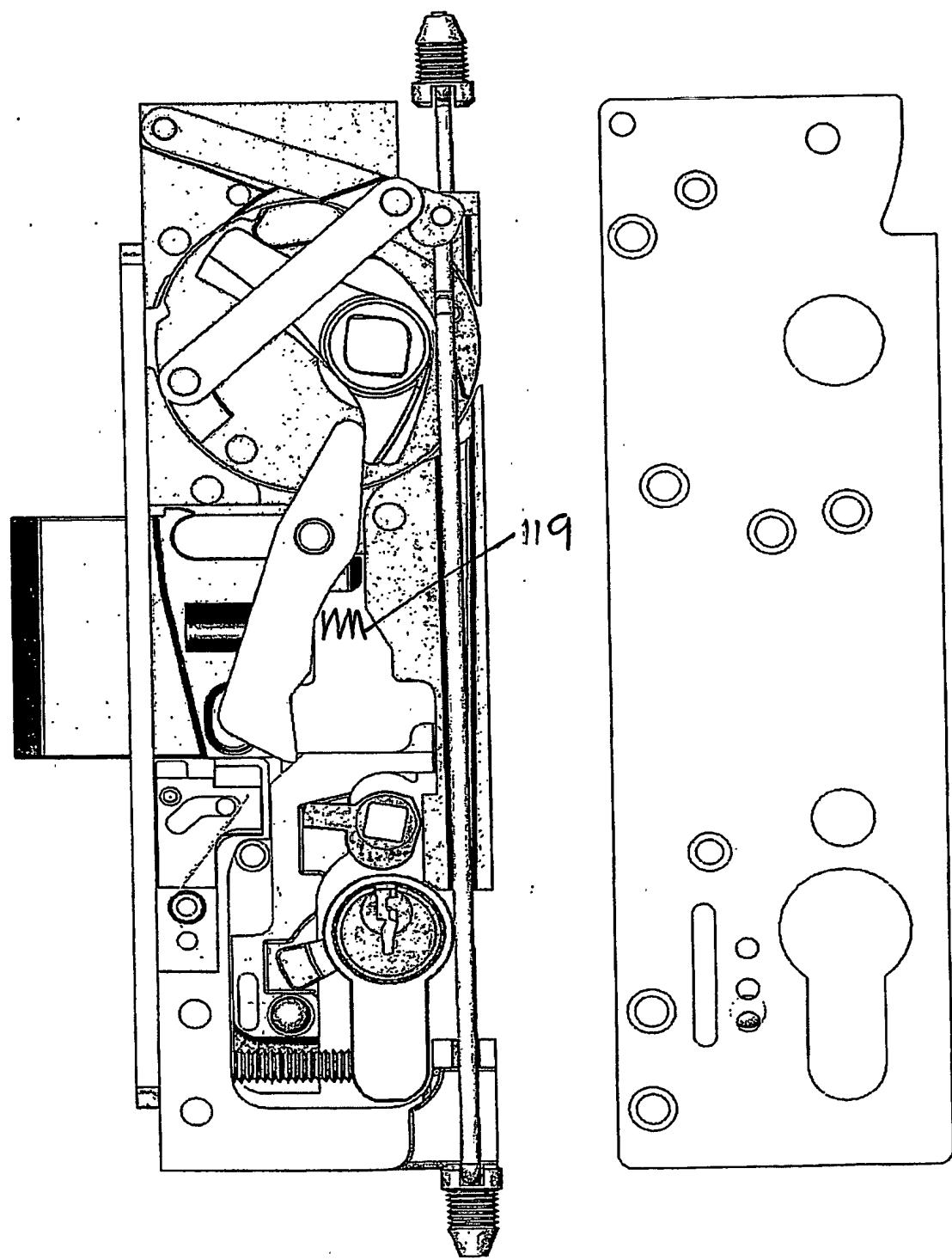


Fig 17

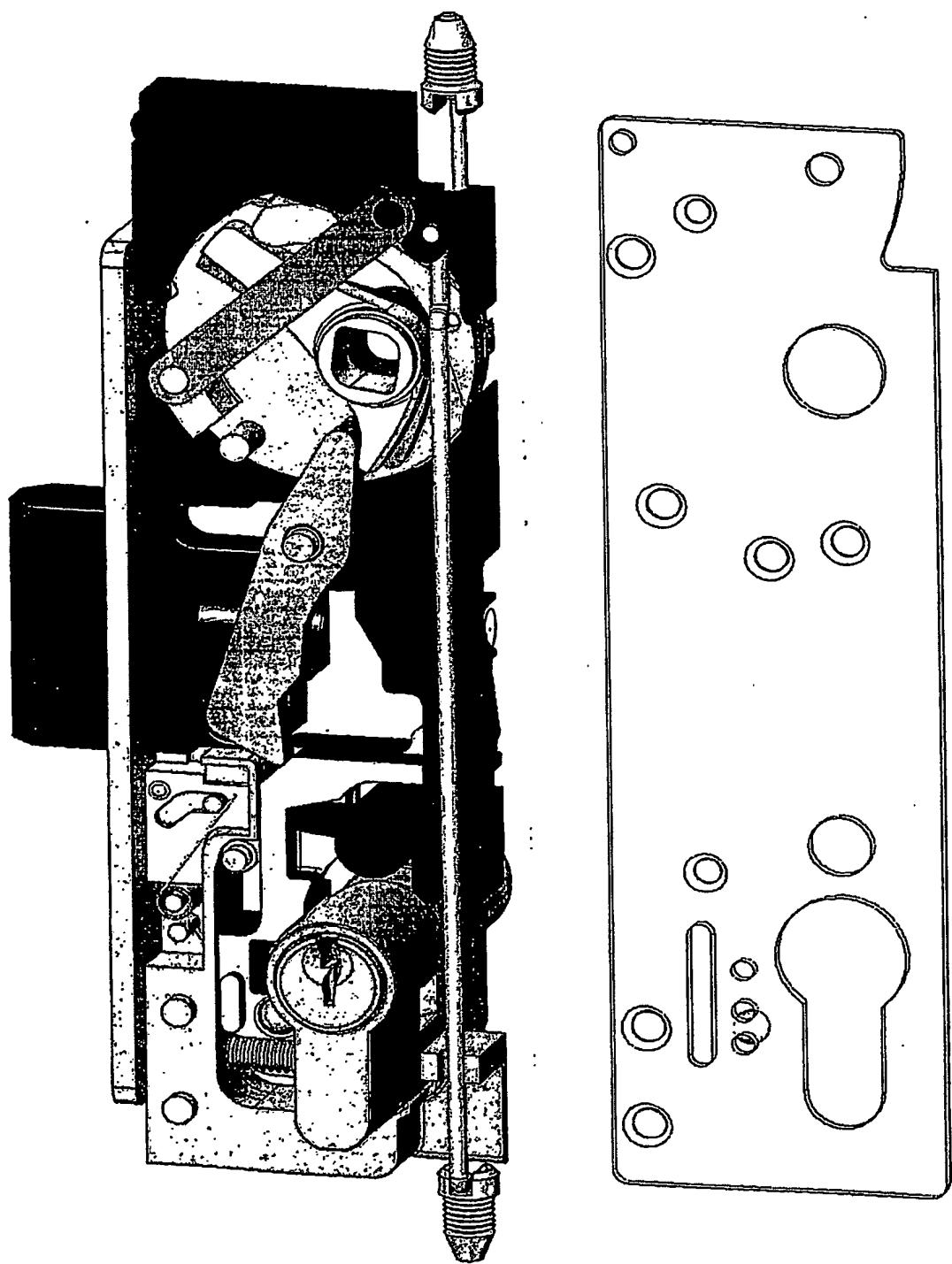


Fig 18

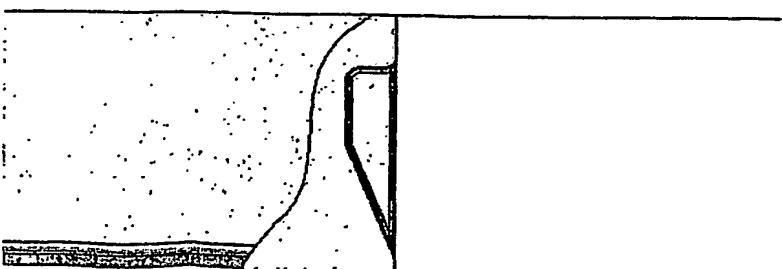
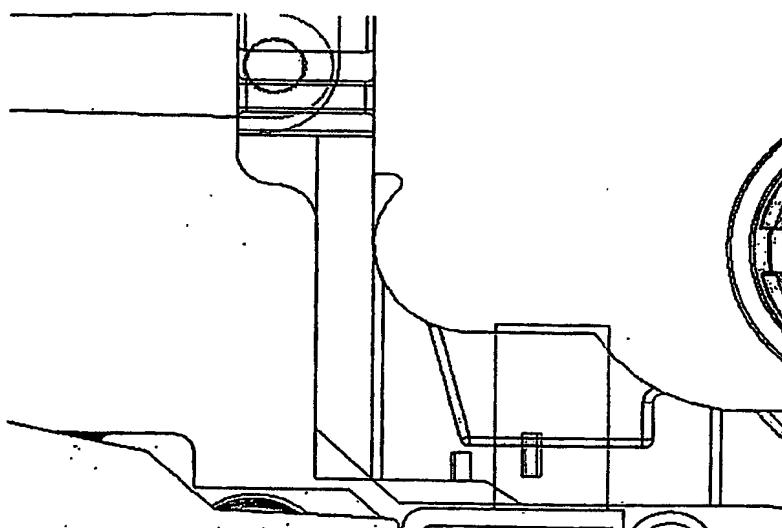
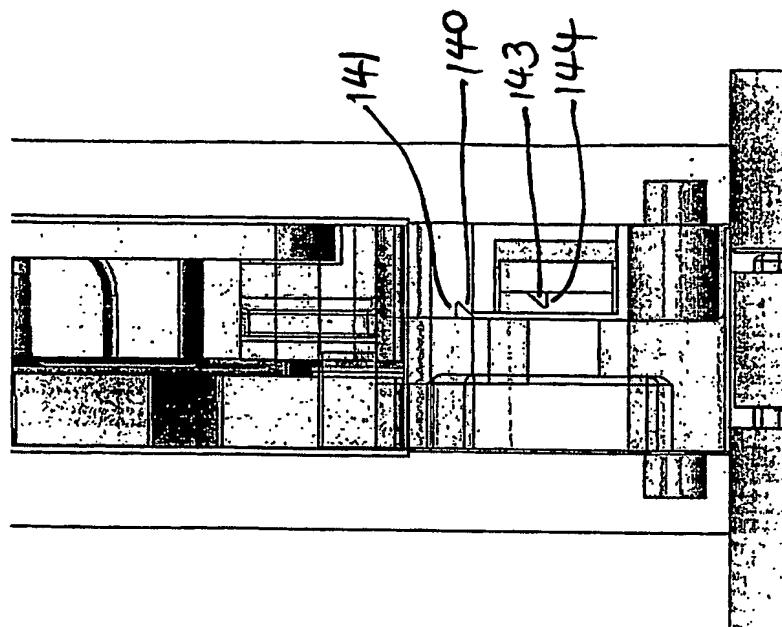


Fig 19.1

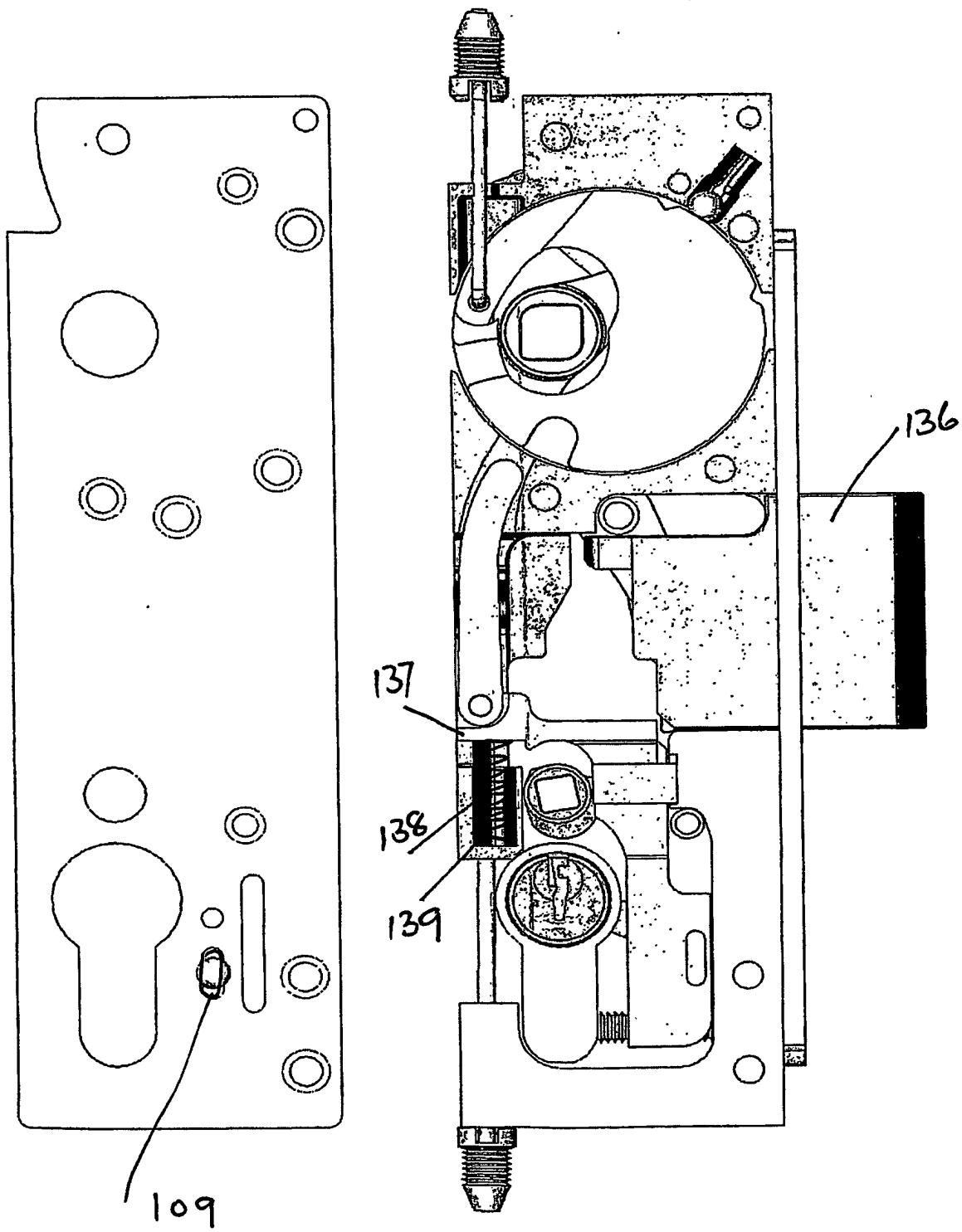


Fig 19.2

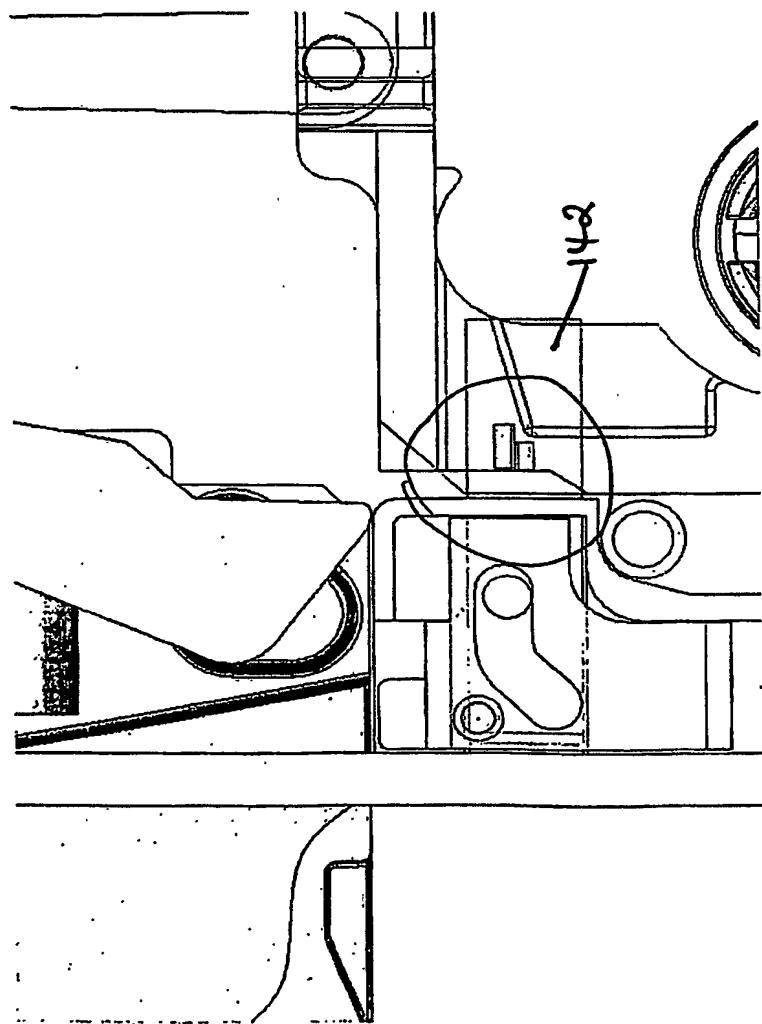
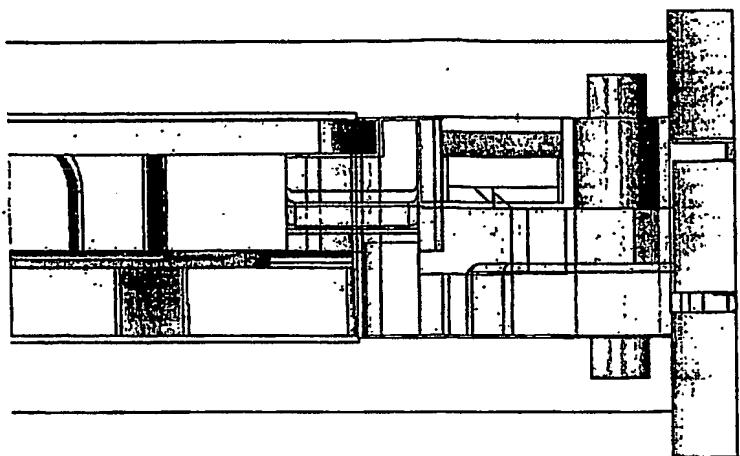


Fig 19.3

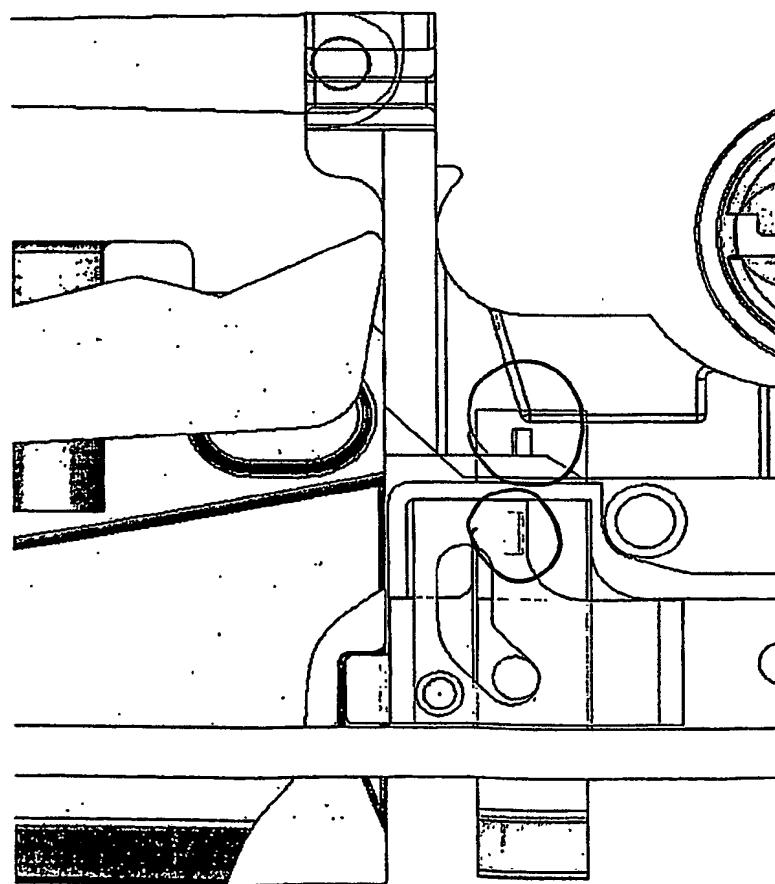
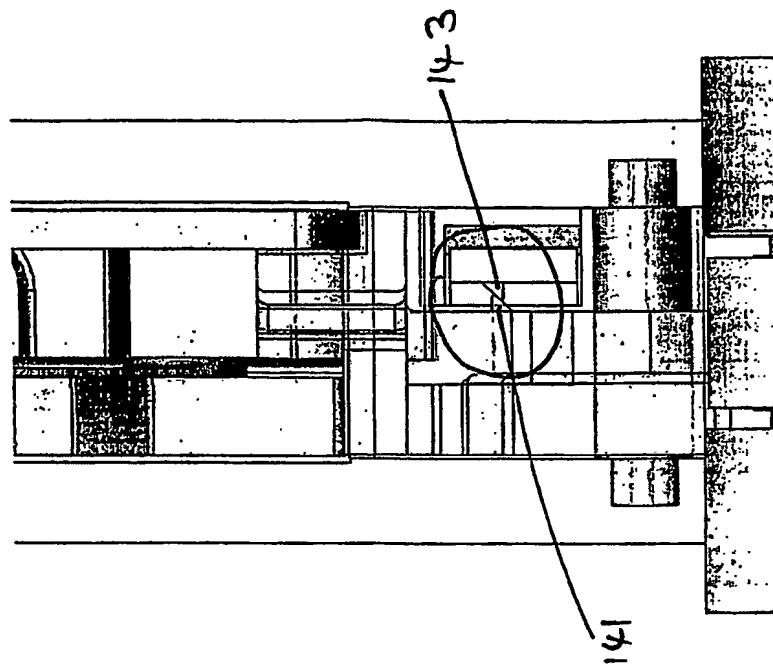


Fig 20

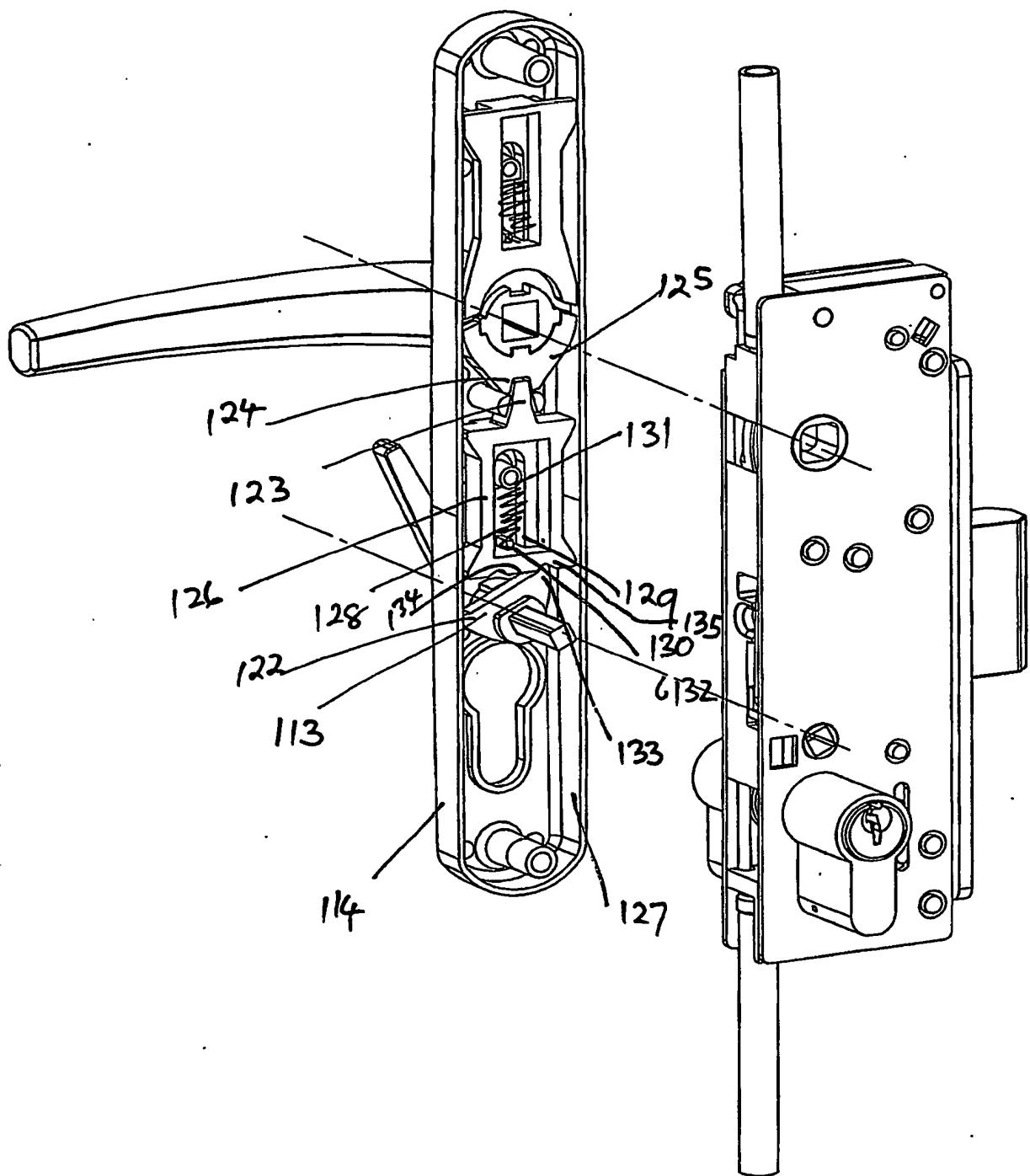


Fig 21

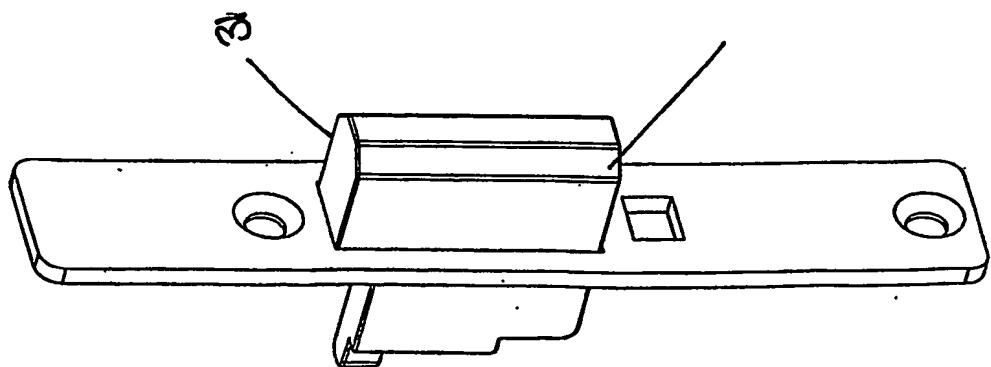
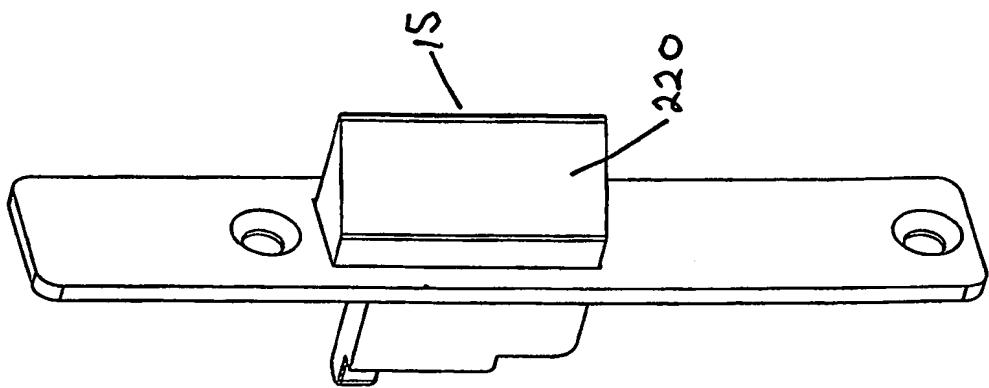
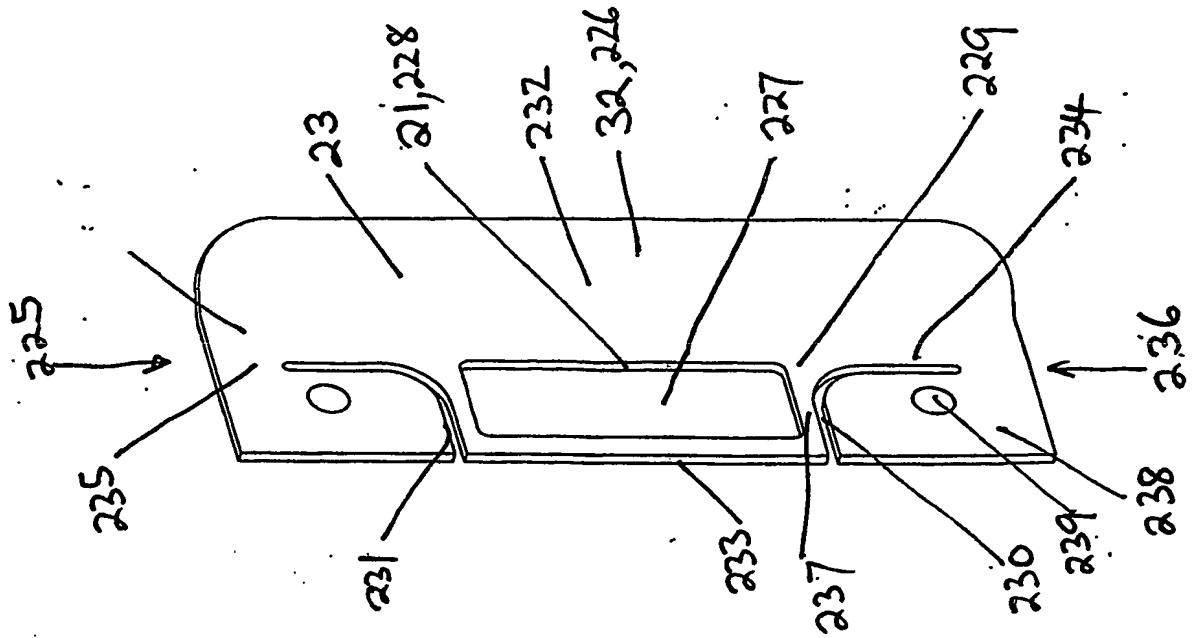


Fig 22

Fig 25

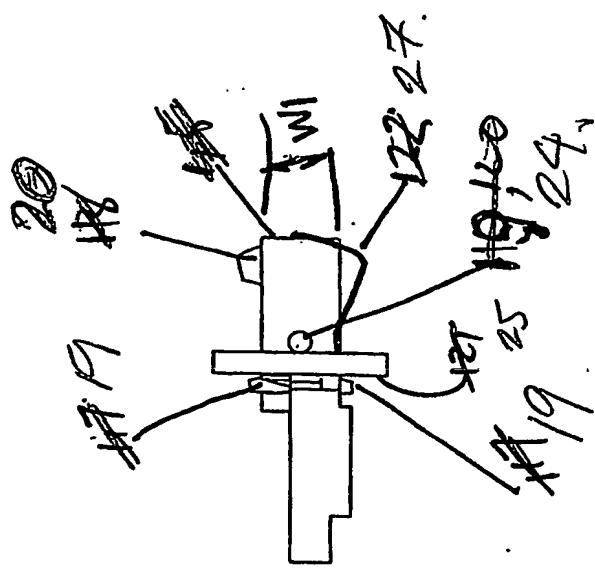


Fig 24

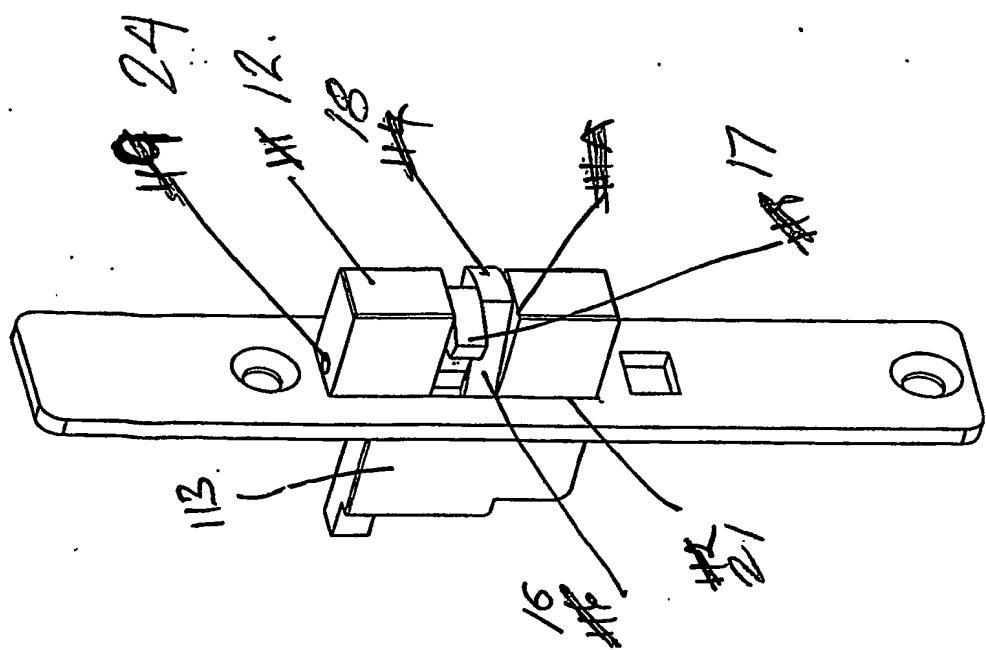
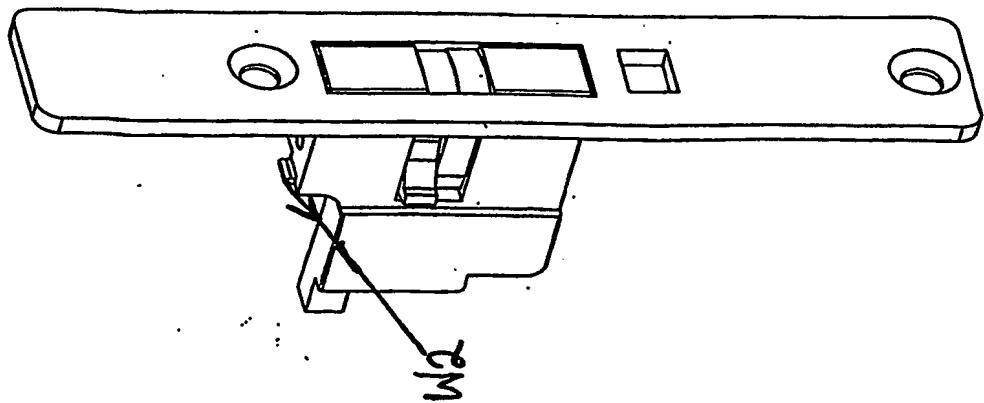


Fig 23



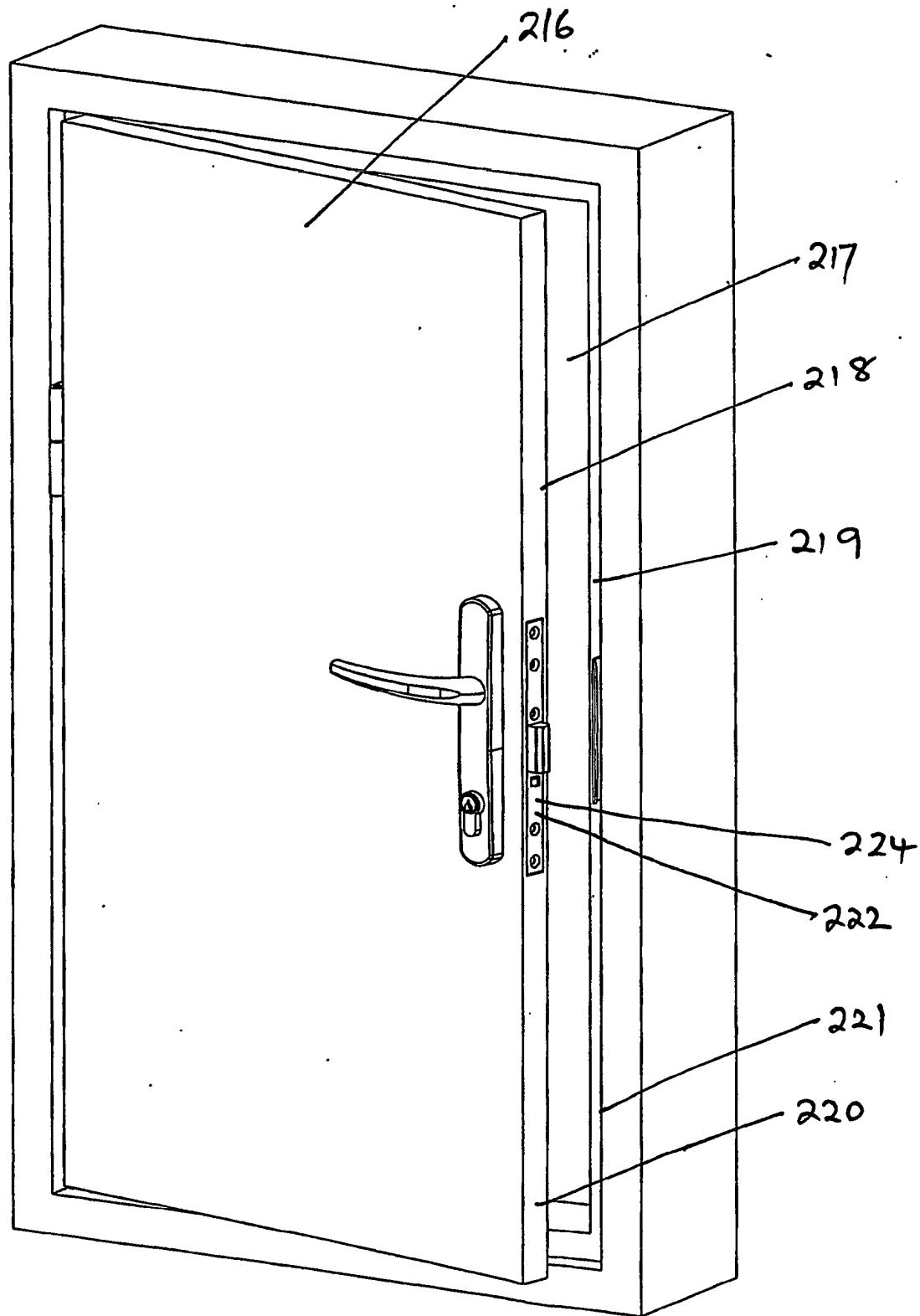


Fig 26

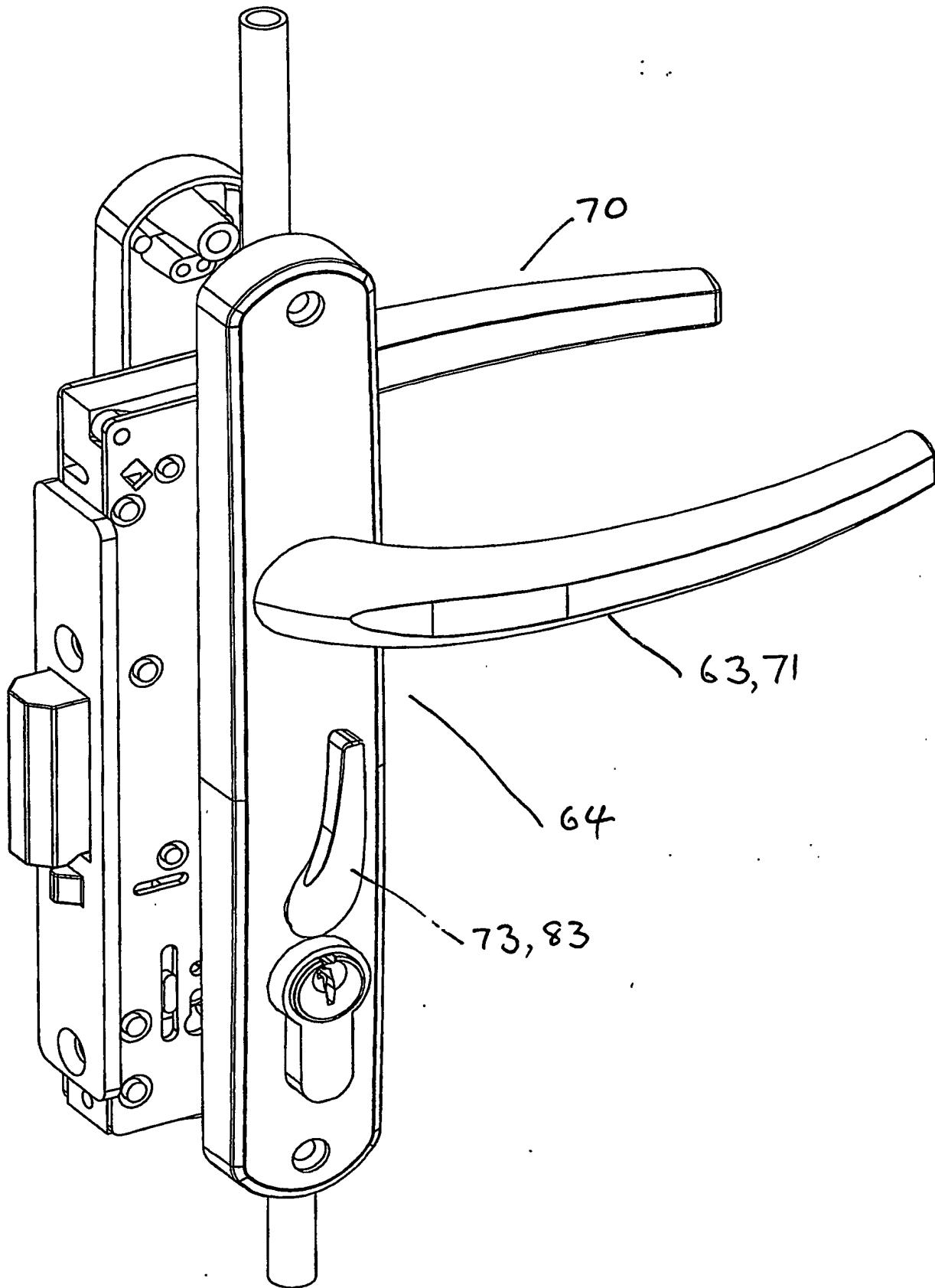


Fig 27

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